[*With the Author's Compliments.*

University of Glasgow.

THESIS FOR THE DEGREE OF M.D.

ON MALPOSITIONS OF THE KIDNEY.

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ON MALPOSITIONS OF THE KIDNEY.

At the present time there is great diversity of opinion in regard to the pathological importance and therapeutic indications of misplaced kidney, and more particularly when the misplacement is associated with mobility of the organ. The majority of observers regard cases where the kidneys are permanently fixed in an abnormal situation merely as anatomical curiosities of no clinical importance; but when the organ floats free in the abdomen, and gives rise to serious symptoms, it is not an uncommon occurrence to find that the surgeon considers the life of the patient so much in danger, that he does not hesitate to extirpate the kidney. In regard to the latter condition, two extreme views are held by Keppler on the one hand, and Landau on the other. The former considers that a movable or floating kidney should be excised as soon as it is detected, and regards it as a continual source of danger to the patient; while the latter goes so far as to say that death does not result from this condition, and that in no case is nephrectomy justifiable. Between these two opinions there is plenty of room for discussion. Several cases of displacement of the kidney having within the last few years come under my observation in practice and in the *post-mortem* room of the Glasgow Royal Infirmary, I venture to put them on record, and at the same time desire to make some observations regarding their etiology, pathology, and diagnosis, and to express an opinion as to the line of treatment which should be employed in such cases.

Displacements of the kidney may be divided into three kinds—simple misplacement, without mobility of the organ; "movable kidney," where the kidney is perceptibly mobile behind the peritoneum; and "floating kidney," where the peritoneum forms a meso-nephron which attaches the kidney loosely to the spine.

I. SIMPLE MISPLACEMENT WITHOUT MOBILITY.

Simple displacement of the kidney without mobility is by no means uncommon. Perhaps no organs in the body vary more in their position than the kidneys. Their relative distance from the spine, or their position in relation to other organs is observed to vary considerably. For instance, without any evident cause, one may be found close up to the spleen, almost touching the diaphragm and vertebral column, while the other organ is situated considerably below the crest of the ilium, and removed some distance from the spine. From observations which I have made regarding this point, it seems clear that malposition of the kidney within certain limits is a pretty frequent occurrence, and may exist without causing any disturbance. In 300 *post-mortem* examinations eight cases occurred where the position of one or both kidneys might be described as abnormal. In three of these cases there was also malposition of the supra-renal capsule. Malposition of the kidney does not, therefore, necessarily involve an alteration in the position of the supra-renal capsule, although the intimate anatomical relationship which exists between them might lead one to expect that any condition causing the kidney to occupy an anomalous position, would also cause a disturbance of the corresponding supra-renal body. One case was peculiar, and was the only instance where the displacement was very marked; in the others, the abnormality might have been overlooked had care not been taken to observe the exact position of the organs. In the case referred to the right kidney was situated about half-an-inch to the right of the promontory of the sacrum, and the left in the iliac fossa, two inches to the left of the sacro-iliac synchondrosis. The right kidney was small in size, and so altered in form that there was no hilus, and the ureter passed from the lower aspect of the organ. The tissue of the organ was normal in appearance, and the arteries, two in number, came off from the aorta about an inch above its bifurcation. The left kidney was normal in every respect, except in its position. There was no evident cause for the abnormality; the other abdominal organs were practically normal, and there was no indication of inflammatory or other mischief within the abdomen. Many such cases have been recorded. M. Aubé mentions a case where the left kidney was found between the common iliac arteries, close to their origin from the aorta. Pacoud narrates another, in which a kidney was found situated in the pelvis between the rectum and bladder, and somewhat similar instances have been described by Drouin, Bellini, Andral, Bonet, and others.

In my own cases, and in those referred to by these observers, alteration in form of the displaced organ seemed to depend on the situation occupied by it. For example, in M. Aubé's case the kidney was flattened, and its anterior surface divided into three parts by two depressions formed by the passage of two arteries. As a general rule, malpositions of the kidney are associated, particularly when the displacement is congenital, with some deviation from the normal in regard to the position of the large intestine and peritoneum, and not uncommonly the distribution and number of the blood-vessels and the course and length of the ureter are found to be abnormal. Roberts states that in twenty-one cases of congenital malposition of the kidney, which he was able to collect and compare, the abnormality was in every instance confined to one kidney: and the left kidney was much more commonly affected than the right (left 15, right 6). Most frequently the kidney was found lying obliquely on the sacro-iliac synchondrosis. In some cases the organ was fixed beside the uterus, or transversely between the rectum and the bladder, or across the prominence of the sacrum.

Dr. Butler has described and figured a curious and interesting case where the kidneys were united, or fused into one, with a central line or raphé making a longitudinal fissure over the surface of the organ, better marked on the posterior than on the anterior aspect. In length, they extended from the border of the fourth lumbar vertebra downwards over the promontory of the sacrum to the middle of that bone—in all, five inches; and in breadth measured three and three-quarter inches. The ureters sprang from a pelvis, which occupied the centre of the anterior surface of the organs, and then passed off on each side, and discharged into the bladder at the usual sites. The arteries supplying the organs were four in number—above, a single large trunk came from the aorta, just at its bifurcation, immediately in front of the sacra media artery, and, passing downwards, before entering the substance of the kidney, broke up into five small branches; on the left side, two arteries came from the left internal iliac, near its origin; on the right side, an artery passed into the organ from the right internal iliac.

These remarkable cases of malposition of the kidney seldom give rise to serious symptoms, and not uncommonly escape observation during life. Cases, however, have been recorded where the misplaced kidney has been mistaken for an abdominal tumour, or, in the female, has from its position within the pelvis become a serious obstacle to parturition.

Besides being liable to congenital malposition, the kidney may be displaced upwards, downwards, or laterally from the enlargement of other organs, such as the liver, spleen, supra-renal bodies, or pancreas, or from the pressure of tumours near them. When the right kidney is depressed by an enlarged liver, not an uncommon accident, it is most usually rotated on its short axis, so that the hilus is turned upwards, and the upper portion of the kidney is most depressed. Rayer mentions an instance where the right kidney was forced down by an enlarged supra-renal body, and cites a case of Hohl's, where a kidney, situated deeply on the inside of the psoas muscle, offered an obstacle to parturition by retarding the passage of the child's head.

The number of cases of fixed malposition of the kidney, now upon record, are very numerous. Most of them, however, were discovered after death, and only in a few instances was any inconvenience occasioned during life.

II. MOVABLE AND FLOATING KIDNEY.

The terms, "movable kidney" and "floating kidney," are used by most writers as synonymous. It is necessary, however, to carefully distinguish between those two conditions in order to have a clear understanding of the pathology of the subject; and also, for the sake of treatment, it is well to have an exact mode of expression and an accurate knowledge of the varieties of the malpositions which may be met with in practice.

In cases of "movable kidney" the organ is mobile behind the peritoneum, either within its adipose capsule, or in a sac formed between the peritoneum and the muscular wall of the abdomen, whereas, in cases of "floating kidney," the kidney moves about within the cavity of the peritoneum, and is attached by a mesentery to the spine.

The distinction here drawn between movable and floating kidney was adopted by Sir William Jenner, in his Clinical Lectures on the Diagnosis of Extra-pelvic Tumours of the Abdomen; he says—"I told you that the kidney is moved a little by the respiratory movements. Sometimes it can be moved by the hand, and this much more frequently than you would suppose. A movable kidney is one thing; a floating kidney is another. We very rarely see or feel a floating kidney. I have never met with one after death, though I have felt in a patient what has been supposed to be one. A floating kidney is a kidney that has a mesentery—a fold of peritoneum attaching it very loosely to the spine. A floating kidney, therefore, can be moved about to a considerable extent—to the extent of the length of its mesentery. A movable kidney can only be passed up and down a little; it slips a little under your fingers." In a report, by a Committee of the Pathological Society of London, appointed to inquire into the matter of displaced, movable, and floating kidneys, the following passage will be found:—"Looking at the matter of kidneys unduly movable, we think it well to divide them into two varieties. The first form is that in which the organ may be moved to some extent beneath the peritoneum. A certain degree of this mobility is not very uncommon. It will be found to be present in a considerable number of subjects, if, as soon as the body be opened, the kidneys be handled without the removal of any of the organs. The amount of movement possible is not commonly greater than an inch or two upwards and downwards. Occasionally, however, a flaccidity of the peritoneum exists to a much greater extent, so as to allow the kidney to move under the peritoneum over a space, described in one of the reports sent to us, as a circle having a diameter of eight or nine inches. In the second variety, the peritoneum passes over the posterior surface of the kidney, forming a kind of meso-nephron.

"From the evidence which has been laid before us, it appears that these so-called floating kidneys may depend upon either of the above states; that the peritoneum may be flaccid and loose to such an extent as to allow the kidney to move under it, so as to come in contact with the wall of the belly; or to leave its natural place and pass to or below the brim of the pelvis; or, indeed, in some cases, to encroach upon the opposite side of the belly. A like movableness or floating of the kidney may be due to the presence of a meso-nephron, already spoken of. It will, therefore, be seen that the terms movable and floating kidney must not be used as strictly corresponding to two anatomical varieties, since a kidney without a meso-nephron may give rise to all the clinical phenomena shown by one with a meso-nephron. Both these anatomical varieties merge by insensible degrees into one another, and these two expressions, movable and floating, can only be used as implying different degrees of the diseased state, which, according to its extent, may give rise to a slightly mobile or an extremely mobile kidney."

In the above statement there are several points to which we will refer hereafter.

There was considerable doubt thrown upon this subject by Mr. Lawson Tait in a short paper in the *British Medical Journal*, of November last, where, in reference to a case "pronounced to be a 'floating kidney' by several distinguished authorities," but which proved to be a distended gall bladder containing a large number of gall-stones, he said—"I put the floating kidney theory altogether on one side; besides, I have never seen such a thing, either in life or in a museum, nor have I met any one who has. In fact, I have no belief in its existence as a pathological incident." The truth of this rather bold statement was controverted shortly after in a letter by Dr. Seymour J. Sharkey, of London, who evidently understood Mr. Tait to refer in his paper to movable as well as floating kidney. Although Mr. Tait used the term "floating kidney" in his paper, there is no evidence in his remarks that he limited it to cases of undue mobility of the organ owing to the presence of a meso-nephron; it seemed rather that he wished to deny the possibility of both conditions. In a subsequent letter, however, he confines the term "floating kidney" "to the state in which the kidney moves by reason of the existence of a meso-nephron," and affirms that he has never seen, nor is there recorded, so far as he can discover, "any instance where, by reason of this kind of mobility, a 'movable kidney' has been an incident of any pathological importance."

Floating kidney is no doubt less common than movable kidney, but whether the peritoneum remains loose or becomes united around the kidney does not in any way increase or diminish the pathological importance of the displacement, although from a surgical point of view the former must be regarded as more dangerous than the latter condition. Both varieties appear in certain cases to be equally troublesome to the patient. Several cases of floating kidney have been recorded, and if Mr. Tait had taken the trouble to look up the literature of the subject, he would no doubt have come across them. I may mention two of these, where it is distinctly stated that a meso-nephron was found to be present. Dr. William Henderson, in the *Medical Times and Gazettte*, 1859, vol. ii, p. 501, states, in reference to a case of his, that "on examining the abdomen, the right kidney was found to be perfectly movable, and was suspended, as it were, by a prolongation of the peritoneum enclosing the kidney, and forming a distinct mesentery, which allowed it to move in all directions."

That this case was not only of pathological, but also of clinical importance, is obvious from its history. "She still complained of the shooting pain occasionally passing through the abdomen, and which she referred to the tumour. These pains being entirely distinct from the constant pain caused by the diseased vertebræ, I was at that time led to suppose the tumour to be of a malignant nature, and probably connected with the mesentery or omentum. . . . The tumour at this time could not be discovered; and any effort on her part to cause it to protrude was attended by the same shooting pain passing through the abdomen."

Dr. Priestley has described a case, in the same journal for 14th March, 1857, p. 262, where, at the *post-mortem* examination, "the peritoneum was found reflected over the posterior surface of the kidney, giving it thus a mesentery, and allowing it very considerable motion in the right side of the abdomen"; and at a meeting of the Glasgow Pathological and Clinical Society, held in April, 1883, Dr. Lindsay Steven showed a specimen where there was a renal mesentery.

From the remarks quoted from Sir W. Jenner's lecture it would appear that he bases his diagnosis between movable and floating kidney upon the amount of mobility observed. "A floating kidney can be moved about to a considerable extent—to the extent of the length of its mesentery. A movable kidney can only be passed up and down a little, it slips a little under your fingers." The Committee of the Pathological Society also used the degree of mobility as a means of distinguishing between the two conditions, although they were aware that an equal amount of movement may result from either state. The clinical distinction may be difficult, but as far as the anatomy is concerned, the two varieties are easily and clearly separated from one another. The importance of discriminating between the one variety and the other is all the greater when operative interference is contemplated. In the case of the movable kidney the organ may be got at from behind, without opening the cavity of the peritoneum, whereas in floating kidney (where there is a meso-nephron), the kidney lies within the cavity, and cannot be reached without entering the peritoneum.

In the following pages care will be taken to distinguish the two forms by their proper terms.

MOVABLE KIDNEY.

If the condition of the kidneys as regards mobility be observed in a large number of bodies, a certain degree of movement, sometimes amounting to two or three inches, will be found to be not uncommon. The peritoneum in many cases, particularly in women who have borne large families, is very flaccid, and its union with the posterior abdominal wall is but slight; and if, in addition to the loosening of the attachment of the peritoneum, the normal adipose tissue surrounding the kidneys has become atrophied, more or less movement of the organs may be permitted. The right kidney is more liable than the left even to slight disturbance. This is probably due to the fact that normally the right kidney is not bound down so firmly to the abdominal wall as the left. This movement seldom exceeds an inch and a half, but to this extent it is very common. Slight movement of the kidney is not of great importance, unless in so far as a study of the causes of it may throw some light upon the etiology of the graver forms.

Before considering in detail the etiology and pathology of these conditions, a few remarks regarding the topographical anatomy of the kidney may not be out of place. The kidneys are placed on either side of the vertebral column, on a level with the last dorsal and upper two or three lumbar vertebræ, the right organ being as a rule a little lower than the left. They are usually considered to lie posterior to the peritoneum, but Arnold believes that they are placed between two layers of the peritoneum posterior to the general peritoneum cavity, so that the kidneys may be exposed without opening the latter. They are kept in their position by their vessels and loose areolar tissue, and, according to Landau, the attachment of the left kidney is firmer than that of the right. The coverings of the kidney may be divided into two distinct portions, the true or fibrous capsule forming a thin, smooth, and firm investment, which can be easily separated from the substance of the organ, to which it is united by delicate processes of connective tissue, and by minute blood-vessels; and the outer capsule, tunica adiposa, composed of loose areolar tissue, in which a varying amount of fat may be deposited according to circumstances. In obese persons the fat is frequently considerable in amount, and may prove a source of error in estimating the size of the kidneys. The outer layer of the tunica adiposa is firmer than the part in apposition to the kidney. When corpulent persons emaciate rapidly, this capsule becomes very loose from absorption of adipose tissue, and its attachments to the kidney on the one hand, and to the surrounding parts on the other, become less firm than normal, and so may favour any tendency to undue mobility.

All who have opportunities of examining a large number of bodies must have noticed how frequently the kidneys are loosely attached to the surrounding parts, and thus capable of movement. Either the kidney is movable within the adipose capsule, or it and the capsule are together movable behind the peritoneum. This is to be observed particularly in persons who have been corpulent, and have emaciated before death.

ETIOLOGY.—In 1,422 patients which he examined, Skorczewsky found that 32 females out of 1,030, and 3 out of 392 males, suffered from movable kidney. In 19 patients (2 males, 17 females, 9 of whom were primiparæ, 8 multiparæ) the right kidney was movable; and in 11 patients (1 male, and 10 females, 6 of whom were primiparæ and 4 multiparæ) the left kidney was movable. Both kidneys were movable in 5 primiparæ. The affection is therefore much commoner than is usually supposed, nearly two and a half per cent of the patients examined having been found to suffer from it. The fact that mobility of the kidney is more common in women than in men is established by statistics. In 290 cases which I have been able to collect, 252 were in women and 38 in men, or about one male case for seven female. The age at which this affection is most frequently met with corresponds to the child-bearing period and a few years succeeding it. Thus, about 46 per cent of the cases were observed between the thirtieth and fortieth years, and 20 per cent from forty to fifty years of age, and, in all, 81 per cent between the ages of twenty and fifty.

The undue proportion of female cases and the period at which the malady is most commonly seen, seem to indicate that pregnancy may have something to do with the production of the affection, either by causing an undue looseness of the abdominal walls, by pressure of the expanding or contracting uterus, or by the spasmodic voluntary muscular efforts during parturition. In the cases recorded by Sawyer, Becquet, Roberts, and others, most of the patients have been women who have borne children. The first named observer has proposed a theory for explaining the production of movable kidney. In the cases which he has seen he has noticed a curious fact—namely, the relationship which exists between the menstrual period and the time when movement of the kidney commences. He believes that at the menstrual period the kidneys become congested, so that displacement may result from the increase in the weight of the organ. Dr. Gueneau de Mussy adopts this view, but adds, however, that while he quite recognises that congestion may supervene, sometimes as a pathological condition, and sometimes as an epiphenomenon in the malady we are now considering, it must be admitted to be neither a constant cause nor a necessary complication, because movable kidneys are not uncommon in men. In my first and third cases certainly there was an increase in the severity of the symptoms during the menstrual periods. In the first case, during the intervals, the left kidney seldom troubled the patient; but at her illnesses, which usually lasted for three or four days, it was sure to become displaced and give rise to severe symptoms. I fancied that the organ was increased in size and weight at these periods, and the patient, without the idea being suggested to her, remarked several times that she thought that her kidney was heavier when she was ill. Anything that causes a flaccidity of the abdominal walls and dragging upon the viscera, especially the colon, will tend to loosen the posterior attachments of the peritoneum. And, if this be associated with diminution of the amount of the normal fat surrounding the kidneys, it will be easily understood that mobility of the kidney may be produced.

Dr. Sawyer, in a paper on the subject, remarks:—" Many, perhaps by far the larger number, of the subjects of floating kidney are women who have borne children. All the examples which have fallen under my notice have been observed at some period after child-bearing. To what extent a difficult and protracted labour may be concerned as a cause, I am unable to say. The powerful and prolonged contractions of the diaphragm which are incidental to such a condition would, doubtless, favour displacement of the kidney. I think, however, the circumstances which determine the liability to this affection arise rather as a result of the sudden removal of pressure which the distended uterus exercises on the kidneys in common with other organs within the abdomen. The tendency to falling forward of the viscera, as a result of the impaired support afforded to them by the abdominal walls, in a woman who has borne children, seems likely to contribute to the production of floating kidney. Feeble women, with lax and atonic tissues, are probably more subject to this abnormality than those who are more robust."

The objections raised against the theory that repeated pregnancies frequently cause this condition are—that it happens in women who have not borne children; in those who have given birth to large families few suffer from it, and that it is usually unilateral; it is not contended that pregnancy is the only cause; it must be admitted, however, to be at least a frequent one.

Landau has pointed out that about 25 per cent of the cases observed by him had pendulous belly; 13 per cent had descent of the uterus or prolapse of the vagina; 7 per cent had hernia, and 15 per cent retroflexion of the uterus; so that in all more than a half of the patients suffered from other conditions dependent upon laxity of the perineum or abdominal walls.

Another supposed cause, which has been made a great deal of by some observers, is tight lacing. Dr. Roberts quotes a passage from Cruveilhier bearing upon this point:—"I have often observed, in women who wore tight stays, the right kidney to lie sometimes in the right iliac fossa, sometimes in front of the sacro-iliac synchondrosis, sometimes even in front of the vertebral column, at the level of the adherent border of the mesentery, in the substance of which it was placed. The kidney, thus accidentally displaced, enjoys a certain mobility. This displacement arises when the pressure exercised on the liver by the stays dislodges the right kidney from the kind of niche which it occupies on the under surface of this organ." Dr. Roberts, and other eminent authorities in this country, agree with this view, while Landau considers the corset of little or no importance as a cause of movable kidney. In studying the etiology of this disease, it should not be forgotten that the forces which keep the abdominal organs in position are not limited to what may be described as their anatomical attachments. The walls of the abdomen tend to retain the abdominal organs in position. If the abdomen be opened and the body raised upright, the liver and kidneys will fall perceptibly on account of their support being removed. The abdominal organs are very loosely bound to the parietes, and their limiting structures or capsules are easily distended, either by an alteration in the vascular condition of the organ or by morbid processes. Should the support resulting from the elasticity and resistance of the abdominal walls be removed, or, what amounts to the same thing, should the contents of the abdomen be suddenly diminished in amount, as after delivery, then the suspension of the organs rests with their anatomical attachments. In the upper and middle classes of society, women, after delivery, usually retain the recumbent posture for some time—long enough to allow the abdominal walls to regain their firmness and elasticity. It is otherwise with the poorer classes; they require, from necessity, to resume their occupations as soon as possible, not unfrequently within a short time of delivery, without proper regard to their condition.

Now, it is persons in this very class who are most subject to displacements of the kidney. The great majority of the cases recorded are from hospitals, in other words, from a class of people who are poor and are not, as a rule, accustomed to what is described as tight lacing, but are wont to neglect themselves during and after delivery. If they were to use an abdominal corset after parturition, they might prevent a condition for which an article they do not wear has been popularly blamed.

I can easily understand that tight lacing might cause fixed misplacement, but, that movable kidney could result from it alone, is not admissible. Cruveilhier's remark, which I have already quoted, refers mostly to fixed malpositions, or malpositions with only slight mobility.

Oser, of Vienna, considers that pregnancy is one of the most common causes of movable kidney, and states that, amongst the poor of Austria, 10 per cent of the women who have borne children suffer from it, and Professor Bartels, of Kiel, has also found it frequently amongst working women, but attributes it to the habit of wearing tight waist strings to hold up heavy clothing.

The next question which suggests itself for consideration, is the reason why the right kidney is more subject to this abnormality than the left.

The following table is copied from Landau, and shows very well the comparative frequency of the condition on the right, left, and both sides:—

NAMES OF THE AUTHORS.	NUMBER OF CASES.	RIGHT KIDNEY.	LEFT KIDNEY.	BOTH KIDNEYS.
Aberle, - - - - -	4	4	...	...
Rayer, - - - - -	7	5	1	1
Dietl, - - - - - -	9	8	...	1
Rollet, - - - - -	22	18	3	1
Henoch, - - - - -	6	5	...	1
Guéneau de Mussy, - - -	12	11	1	...
Jago, - - - - - -	5	5	...	...
Schultze, - - - - -	3	3	...	...
Kowatsch, - - - - -	5	5	...	...
Thun, - - - - - -	4	3	1	...
Klüpfer, - - - - -	3	3	...	...
Fourrier, - - - - -	6	5	...	1
Keppler, - - - - -	11	10	1	...
Oerum-Howitz, - - - -	34	28	4	2
Landau, - - - - -	42	39	1	2
Total, - - - -	173	152	12	9

When the fact is known that the displacement occurs more frequently on one side of the body than on the other, one naturally seeks an explanation in the different anatomical relations of the organs on the two sides. The liver has been the organ most blamed. It is supposed that, either from its own weight, or by communicating the diaphragmatic movements, it presses down the right kidney. It is true that the liver seems more likely to cause displacement of the right kidney than the contents of the left hypochondrium to cause depression of the organ on that side; and it is to be remembered that during deep inspiration the right kidney is pushed down more than the left. Besides the presence of the liver, there are other anatomical peculiarities on the right side which deserve notice—the greater length of the renal vessels on that side, and the fact that the ascending colon is not so firmly bound to the right as the descending colon is to the left kidney, must have some effect in rendering the displacement more easy on the one side than on the other.

Rayer relates a case in which hernia of the cæcum produced movable kidney by dragging upon the peritoneum. The attachments of the peritoneum to the posterior wall of the abdomen were relaxed so as to permit the kidney to descend by its own weight.

Permanent relaxation of the abdominal attachments is one of the most frequent causes of the condition we are now considering.

In the cases of slight mobility of the kidney which I have seen in the *post-mortem* room the movement has been most frequently observed on the right side, and has been usually associated with emaciation of the body, a lax condition of the abdominal walls, and a looseness of the attachment and lengthening of the meso-colon on the right side, sometimes accompanied by lengthening of the renal vessels. In children the kidneys are, as a rule, pretty freely movable when the abdomen is opened; when the body is placed erect the kidneys may fall some distance, but when again laid on its back the organs regain their normal position.

As long ago as 1857, Oppolzer noticed that in patients suffering from movable kidney, and dying from other diseases, the kidneys when examined were found to be healthy, but in these cases "there has been observable a deficiency in the cushion of fat and a lengthening of the renal vessels," and Dr. Adams published in the same year a letter in which he said—"I remember many years ago having been requested by Dr. Langmore to examine the body of an old lady who was said then to have 'slipped her kidney.' . . . The only peculiarity remarkable was, that the kidney appeared bound down in its situation more loosely than usual, and the old lady, from having been very fat, had become somewhat thinner, and her integuments appeared very lax throughout. The condition of the kidney had nothing whatever to do with the cause of death." There is little doubt that an absorption of the fat surrounding the kidney will render the tunica adiposa more lax and loosen the attachments of the organ, stretch the renal vessels, and permit undue freedom of movement and prominence of the kidney. When emaciation has been very rapid, I have seen the kidneys so loosely attached that they could be easily drawn out in front of the spine without employing force sufficient to injure the connections.

When considering this subject, it is well to refer to a possible fallacy arising from the circumstance that the adipose tissue around the kidney becomes firm after death, so that, even in a case where the kidney was movable during life, it might become so fixed after death as to escape observation.

There are numerous cases published where the immediate cause of the mobility is clearly shown to have been some accident or event occurring in the course of life, such as jerks, causing traction of the viscera in a flaccid abdomen. The kidney may break loose from its attachments as a result of sudden or violent concussion. This was doubtless the cause in my second and fourth cases. Henoch relates two instances in which direct violence was the exciting cause; in one the kidney became movable after a blow on the right loin, while in the other case both organs became displaced after a fall from a horse.

A consideration of the diseases most frequently associated with movable kidney may throw some light upon the etiology of the subject. I do not refer to symptoms depending upon the state of the kidney for their existence, but rather to conditions which may be traced to a common cause, such as displacement of the uterus, prolapse, or hernia of some of the viscera.

From the records of cases which I have had the opportunity of consulting, it appears that general emaciation, pendulous belly, and misplacement or diseased conditions of the uterus are the most frequent complications met with, menorrhagia and leucorrhœa are also common associates.

Landau has paid particular attention to this point, and at the end of his paper the following table will be found, showing, in 45 cases, the relative frequency of the different complications of movable kidney.

No.	Age.	No. of Birth.	Other Diseases.
I. *Movable Kidney on Right Side.*			
1.	36,	9,	Retroflexion of uterus.
2.	32,	7,	Pendulous abdomen.
3.	35,	6,	Do. do.
4.	33,	?	Do. do.
5.	49,	7 in 14 years,	Prolapse of vagina.
6.	47,	12,	Carcinoma of the uterus.
7.	48,	5 in 6 years,	Retroflexion of uterus.
8.	32,	3,	Pendulous abdomen.
9.	44,	7 in 9 years,	Right inguinal hernia.
10.	34,	4,	Pendulous abdomen.
11.	28,	4,	Do. do. Prolapsed uterus.
12.	32,	6 in 7½ years,	Do. do. do. do.
13.	44,	11 in 12 years,	Do. do.
14.	24,	0.	Injury.
15.	47,	0,	Ovariotomy.
16.	30,	8 in 7 years,	Retroflexion of uterus. Icterus.
17.	35.	6 in 12 years,	Pregnancy. Œdema of right leg.
18.	32,	2 in 1 year,	Pendulous abdomen. Strangulation.*
19.	34,	4 in 5 years,	Pendulous abdomen. Icterus.
20.	30,	7,	Retroflexion of Uterus.
21.	58,	8 in 14 years,	Carcinoma.
22.	34,	8,	Morphinismus.
23.	39,	10.	
24.	41,	5,	Right crural hernia.
25.	38,	3,	Do. do. do.
26.	34,	9.	
27.	41,	2.	
28.	38,	?	
29.	51,	?	Retroflexion of uterus.
30.	49,	?	Do. do.
31.	52,	?	Do. do.
32.	60,	?	Carcinoma of uterus.
33.	44,	?	Do. do.
34.	40,	?	Do. do.
35.	29,	2.	
36.	68,	?	
37.	38,	3,	Descensus uteri.
38.	34,	2,	Do. do.
39.	55,	4,	Adhesions at the lower edge of the liver. Strangulation.* Icterus.
40.	59,	2,	Prolapse of uterus. Hydronephrosis.
Movable Kidney on Left Side.			
41.	40,	1,	Pendulous abdomen.
42.	36,	?	Do. do.
Movable Kidney on Both Sides.			
43.	25,	1.	Repeated injury.
44.	36,	0,	Phthisis.
45.	60,	?	Carcinoma of both Kidneys.

* Symptoms of Strangulation. (Einklemmungs-Erscheinungen.)

By analysis of the above table it will be found that 25 per cent of the patients had pendulous abdomen, 13 per cent suffered from descent of the uterus or vagina, and the same proportion were affected with cancerous disease, 15 per cent had retroflexion of the uterus, and 7 per cent had hernia.

The frequency of concurrence with displacements and diseases of the uterus, as proved by these statistics, shows that there must be some relationship in the etiology of movable kidney with these conditions, probably some disturbance of the intra-abdominal relations of pressure. The author, in referring to displacements of the uterus, uses only the term "retroflexion," so as to lead one to doubt whether or not he makes a proper distinction between the two classes of displacements, flexions and versions; in other words, does he discriminate cases where the shape of the uterus is altered, by the body being more or less acutely bent over the cervix, from those in which the uterus retains its normal shape? Concomitantly with movable kidney, the significance of retroversion is much greater than that of retroflexion.

Œdema of the lower extremities occasionally accompanies, and has been regarded by some observers as a direct result of mobility of the kidney. It seems more likely to be the effect of changes in the substance of the organ than of alteration in its position.

Pathological Anatomy.—The changes which take place when a kidney becomes movable are limited to its surroundings; there is not necessarily any alteration in the structure of the organ, although, as seen in my third case, there may be indications of organic disease. The changes in the surrounding structures may be divided into two kinds, those involving the adipose capsule, and those affecting the attachments. In the cases of slight mobility of the kidney, which I have observed in the *post-mortem* room, there has nearly always been atrophy of the adipose capsule, and frequently the kidney moved freely within it, but in all instances the fibrous capsule was found to be normal in appearance, and not loosened from its attachments to the kidney. The adipose capsule, when it becomes atrophied, permits slight mobility of the kidney, and as a natural sequence of these movements of the organ, the capsule becomes distended, and may ultimately form a considerable sac.

The distension of the adipose capsule leads to the peritoneum covering it being loosened from its position against the posterior abdominal wall. In the second variety the adipose capsule remains adherent to the kidney, and the movement is permitted from the peritoneum having become loosened so as to form a pouch in which the kidney and its envelopes move more or less freely. We may therefore have three conditions—firstly, where the kidney moves in its adipose capsule, the capsule itself retaining its position. Secondly, where the first mentioned condition exists and the capsule also has become movable. This is what was found in the case operated upon by me. The capsule formed a distinct sac freely movable behind the peritoneum, and the kidney was easily pushed backwards and forwards within it. Thirdly, those cases in which the capsule and kidney are adherent, but where the peritoneum and the attachments of the capsule to the posterior abdominal wall have become relaxed.

In a considerable number of instances of movable kidney the renal arteries have been found lengthened, but normal in their origin from the aorta, unless when the condition has been congenital. Abnormal origin of the vessels seems to indicate a congenital condition, while simple lengthening of them does not prove the mobility to be other than an acquired state. Sometimes co-existing with the displacement of the kidney there are abnormalities of other abdominal organs, but this is more frequent in cases of floating kidney, to the pathology of which we shall refer hereafter, than in the condition at present under consideration.

Before considering the physical signs, diagnosis, and treatment of movable kidney, I shall give a short summary of the history of four cases which I have had under my care within the last three years. The details will be found at the end of this paper.

SUMMARY OF CASES.—CASE I. Mrs. M'M., æt. 40. Patient has had seven children and three miscarriages in twelve years. Swelling, detected by patient on the *right side* after sixth confinement, and during seventh pregnancy, was associated with considerable pain, dyspeptic symptoms, and vomiting. These symptoms were so severe that she was confined to bed during seven months previous to the birth of the child. Movable kidney detected before, but its real nature not ascertained till after delivery. Pain in *left side* after delivery (7th), but no tumour made out till some months after, when the left kidney was also found to be movable. Temporary relief from rest in bed, poultices and belladonna; unable to wear an abdominal bandage. Symptoms became worse—pain in both renal regions increased during menstrual periods, severe and persistent vomiting preceded and followed by burning pain in epigastric region, sickness, retching, and diarrhœa. Great general emaciation.

Right kidney fixed by operation (nephroraphy). Left kidney kept in position by abdominal bandage. Symptoms due to movable kidney—vomiting, sickness, loss of appetite, and pain entirely disappeared; and operation wound healed in ten days. Patient able to walk about, general health greatly improved. [The symptoms arising from the mobility of the kidney disappeared immediately after, and have not occurred since the operation, three months ago.]

Case II.—Mr. O., æt. 49. Patient was at one time very stout, but has now emaciated considerably. He suffers from chronic bronchial catarrh, attended with muco-purulent expectoration. Slight emphysema, but no bronchiectasis. Mobility of right kidney (caused by fall on left side), is associated with sickening pain, vomiting, and diarrhœa, and occasional suppression of urine, due to strangulation of renal vessels. Patient directed to use a broad abdominal bandage; symptoms greatly relieved as long as the bandage is worn.

Case III.—Mrs. M'D., æt. 43, enjoyed good health till birth of last child. She has had nine children and two miscarriages in fourteen years. Pain in right side, first noticed six months after the birth of her last child; at the same time she became conscious of the presence of a movable tumour in right renal region. After some time the pain became aggravated; almost continual in right lumbar region, increased during menstruation, but becoming very severe at other times independently of ovulation. At these times symptoms of obstruction to excretion of urine are present—increase in the size of tumour, followed by symptoms of uræmia, viz., dimness of sight, severe and persistent headache, lethargy, with or without occasional paroxysms of excitement, nausea, and vomiting. Suppression of urine is followed first by excretion of a small quantity of concentrated urine, and afterwards by a copious flow of urine of a low specific gravity. The attacks co-existing with menstruation are characterized by pain of a dull dragging character, and slight dyspeptic symptoms, such as loss of appetite, sickness, occasional vomiting, and sometimes diarrhœa. In Feb. 1883 (sixteen months after kidney became loose), the movable kidney was observed to be diminishing in size, and small quantities of albumen, and hyaline and granular tube casts were found in the urine. Increased anæmia, emaciation and derangements of digestive organs were complained of. Attacks of pain more frequent. Patient urgent for an operation to be performed for her relief. Question raised as to whether the albumen in urine was derived from movable kidney alone, or from both organs. Ureters catheterized, and the urine from both found to be albuminous. Operative measures therefore not permissible. Abdominal bandage useful, but does not do more than alleviate the symptoms.

CASE IV.—J. M'D., æt. 28, single, (movable kidney, resulting from a fall). Patient was running upstairs when she fell on her right side, the edge of the step coming in contact with the right loin. Accident followed by pain; movable tumour detected soon after, on right side. Symptoms became more severe—frequent attacks of vomiting, sickness, frontal headache, and diarrhœa. No relationship between attacks and menstruation. Symptoms completely relieved by constantly wearing an elastic abdominal bandage extending from Poupart's ligament to level of the seventh rib.

PHYSICAL SIGNS AND SYMPTOMS.—In the great majority of cases the patient accidentally discovers the tumour without the attention having been directed to it by painful or other sensations. When, however, it has become known that one of the kidneys is movable, it is not uncommon to find symptoms develop which are referred to the condition of the kidney.

When the movement of the kidney is slight there may be no subjective symptoms developed, and it may be only after death that the condition is revealed. If, however, the movement is considerable, a tumour, of characteristic renal form, may be discovered on careful palpation. The sensation communicated to the fingers by the kidney can scarcely be mistaken for that of any other kind of tumour, and it is said by some observers that pulsation of the renal artery may be felt; of the truth of this latter statement I have some doubt. The kidney forms an oblong, hard, and resisting mass, the lower extremity rounded, the surface very smooth; it is easily pushed in various directions, downwards, upwards, and laterally, and glides with great facility into the lumbar region. In most cases the abdomen is so flaccid that the organ can be easily grasped with the hand, and when it is manipulated a sickening and peculiar faint sensation, frequently accompanied by pain shooting down the thigh and lower part of the abdomen, is produced. On percussion over the renal region posteriorly, a tympanitic note may be elicited; but a dull note is not got, as might be expected, over the displaced kidney, but rather a muffled tympanitic one. This, of course, is due to the fact that anteriorly the kidney is usually, I might say always, covered by a layer of intestine. When the hand is applied to the postero-lumbar region a depression may be felt when the kidney is displaced, but when it is thrust back to its normal position the natural sense of resistance in the renal region is restored. The note heard on percussion over the renal region in cases of movable kidney shows how unreliable percussion is as a means of diagnosis as to the position of the organ, unless it is considerably enlarged. In Cases II and III displacement of the kidneys makes very little difference in the percussion note; by this means alone it would be impossible to tell when the kidney was in an abnormal position and when it was in its proper place. The sense of resistance on percussion, and the feeling communicated to the hand when it is applied to the region, give more trustworthy results. The respiratory movements may influence the position of the kidney, deep inspiration may force it down, and forced expiration cause it to ascend; while the posture of the body tends greatly to alter its situation. When the patient sits up it falls towards the pelvis, when she lies on her side it inclines towards the middle line or away from it as the case may be, and if she assumes the supine posture the organ passes back to its proper place.

As already indicated, the subjective symptoms may be entirely absent, or so slight as not to attract the attention of the patient or her medical attendant, and they may be chiefly of a local character. In the majority of cases, however, the patient becomes conscious, often accidentally, of the presence of a movable tumour in the abdomen, and complains of a feeling of weight and uneasiness in one or both loins. The pain usually experienced is of a dull character, but may occur in severe paroxysms resembling nephritic colic, and when the kidney is manipulated or pressed upon, a sinking, sickening sensation is experienced. This sinking sensation, or as the patient calls it, a "fainting pain," is very characteristic. It is described by one of my patients (Case II) as being very much the same in character as that produced when the testicle is pressed or slightly bruised. The pain is relieved by the recumbent posture, rest in bed, opiates, and warm applications, and is increased by long sitting, walking, or any kind of exertion, by constipation, and, in females, during pregnancy and the periods of menstruation.

Symptoms of dyspepsia, loss of appetite, sickness, flatulence, colicky pain, vomiting, and diarrhœa, may be present, and the urine may be altered from time to time, both in quantity and composition, and the act of micturition accompanied by more or less pain. In Case III the patient suffers from symptoms which not only indicate a diseased condition of the kidneys, but also point to occasional torsion or flexion of the renal vessels or ureter. These symptoms usually appear suddenly when the kidney is displaced, and disappear in from twenty to fifty-six hours. They consist of suppression of urine, or great diminution in the quantity excreted, severe pain in the renal regions, sickness, nausea, and vomiting, followed by dimness of sight, severe and persistent headache, lethargy with occasional paroxysms of excitement, in other words they are the symptoms of uræmia. These subjective symptoms are associated with a rapid increase in the size of the movable tumour, and the first indication of recovery is a sudden flow of concentrated urine, followed by secretion of a large quantity of urine of a low specific gravity. In Case II the urine was on several occasions suddenly suppressed without any evident cause, the tumour was not increased in bulk, nor indeed was it necessarily out of position at the time the symptoms appeared; the urine was not altered in composition, nor were the subjective symptoms aggravated.

The details of this case will be found in the Appendix.

Hydronephrosis is often connected with movable kidney, but whether it is to be regarded as a cause or as an effect is somewhat difficult to determine. It may be both. When the kidney is moving freely about, the ureter is liable to be twisted and flexed so that the passage of urine into the bladder is retarded or entirely prevented. When such an accident occurs the urine accumulates behind the constriction, and leads to a gradual distension of the ureter and dilatation of the pelvis of the kidney, just in the same way as when hydronephrosis results from pressure of the pregnant or retroflexed uterus. Or again, it can be easily supposed that, in a case of hydronephrosis, the kidney is more liable to become displaced than when the organ is healthy, partly by reason of its increased weight, and partly as a result of the loosening of its connections and of the peritoneum owing to its enlargement.

There are many other diseased conditions associated with movable kidney which it would be of interest to discuss here, but to do so with care would take up too much space.

DIAGNOSIS.—The diagnosis of movable kidney is, when uncomplicated by the presence of other abdominal tumours, comparatively easy, the chief errors arising from practitioners not thinking of the occasional occurrence of the disease. Movable kidney is one of those conditions which one is very apt to overlook simply because it is rarely met with in practice, and although generally recognised as a possible accident, yet the contingency is not taken into consideration in diagnosing the case. Thus, cases are upon record where a movable kidney was mistaken for a spleen, an enlargement of the liver, an abscess, a malignant tumour, or a tumour of the ovary.

In stout individuals, a class of persons in whom movable kidney is not at all frequent, the condition may be difficult to detect by physical examination, but in the great majority of cases the presence of a movable tumour can be easily made out. We have already described the physical signs, so that it is unnecessary again to refer to them further than to say that it is almost entirely upon a proper apprehension of them that the diagnosis of the case rests.

The diseased conditions with which movable kidney is most apt to be confounded are enlargement of the gall bladder, small ovarian tumours, tumours of the mesentery, and tumours of the omentum.

An enlarged gall bladder may sometimes be mistaken for a movable kidney. Mr. Lawson Tait mentions a case upon which he operated, where the diagnosis of movable kidney was made, but which proved ultimately to be one of enlarged gall bladder, containing about a pint of thick, glairy mucus, and eighty gall stones of small size. The tumour was freely movable, it seemed solid, and was shaped like a kidney. It was tender on pressure, and when the hips were raised above the level of the shoulders it could be made to disappear. There was no jaundice.

The points in the physical diagnosis which would distinguish an enlarged gall bladder from a movable kidney are these, the position which it occupies, the fact of the lower part of the tumour being more freely movable than the upper, of the lower end being more rounded, and less resistant on pressure, and the presence of an occasional sense of fluctuation; if in addition to these there be evidences of obstruction to the gall ducts, such as jaundice, absence of bile in the stools, &c., then the probability is in favour of the former condition.

Small ovarian tumours, such as fibro-myomata, located either on the surface or in the substance of the ovary, might lead to some difficulty in diagnosis. The size and form of the mobile body, if possible tracing the tumour to its attachment, and the tendency to increase in size or remain stationary, will help to clear up the case. When the ovarian tumour is large, a mistake in diagnosis is not likely to be made. A collection of fæces in the colon may, at first sight, appear to resemble movable kidney.

The conditions most apt to be confused with, and most difficult yet necessary to discriminate from movable kidney, are small pedunculated tumours of the mesentery or omentum. The smoothness of surface, the ease with which the tumour slips into the lumbar region, the peculiar sickening pain on pressure, the shape and size, the detection of the hilus, the absence of the kidney from its normal position, and the fact that the tumour does not increase in size, indicate the existence of a movable kidney rather than a swelling caused by some form of new growth.

Treatment.—When the nature of the case has been distinctly made out by a careful physical examination, the indications for treatment are sufficiently clear. If, however, the disease is not properly understood, as seems frequently to be the case, not so much from the difficulty in diagnosis as from the possibility of such a malposition not having been brought under the attention of the medical attendant, the patient may be subjected to utterly useless, troublesome, and sometimes injuriously active treatment.

In some persons the inconvenience experienced from displacement of the kidney is not considerable, and very little treatment is required; indeed, in many instances, the symptoms produced are so slight that the condition has been discovered by the patient quite accidentally, and independently of them. In others, disagreeable impressions may only be felt while the patient is moving about or engaged in active employments; when in bed she may enjoy immunity from pain and other symptoms. There are cases, however, where the functions of the neighbouring organs are greatly interfered with, and severe pain is produced by the displacement of the kidney, so that the patient is unable to perform ordinary household duties, or life may even be endangered.

So far as the physical condition is concerned, the evident indication is to endeavour to replace the organ in its normal position and keep it there. With the patient in the recumbent posture, the kidney should be replaced by manipulation and gentle pressure. This is usually very easily accomplished; the difficulty is to keep it in position without exerting undue pressure on it, or upon the neighbouring parts. Various methods have been proposed—tight bandages or belts round the abdomen, with a pad over the kidney to give the pressure more pointed effect, elastic bandages applied in a similar way, and trusses, have all been employed for the purpose of fixing the kidney by external support.

The tight bandage (calico or woollen) seems to me to be of very little service; it very soon becomes slack, and falls out of position.

Dr. Smith of New York has devised a truss for retaining the organ in position. It resembles a hernia truss, except that the spring is straight instead of oblique, and is made long enough for the posterior pads to rest on the side of the spinal column, opposite to that on which the displacement exists. On the posterior end of the truss there are four small pads so placed that two rest on each side of the spinal column, and on the anterior end a soft rubber air pad is fixed, which may be blown up by a tube attached to it, and made either tense or flat, as may be required.

Whether a bandage or a truss be employed, it is necessary that it should be applied in such a manner that the patient can keep it on continuously without complaint, otherwise it is of little or no use. Even though the symptoms disappear for the time being, if the patient suffers from the pressure of the appliance, she will soon throw it off.

The method of employing pressure which I have found most useful, and most easily applied by the patient, is to have a well fitting abdominal elastic bandage, extending from the line of Poupart's ligament to the level of the sixth or seventh rib. The bandage should be made to fit the body accurately and firmly, but without exerting undue pressure at any point. It may be made of one piece, or, what I consider much better, of strips of elastic bandage sewn together, and united in the middle line in front by means of steel slips similar to those used to fix stays. The patient should have her bowels well opened every morning, and then, before getting up for the day, should slip over the lower extremities, and upwards around the abdomen, a tight-fitting jersey, applying over the region of the kidney a hair pad, and then buckling over it the broad elastic bandage.

With this treatment two of my cases (II and IV) are almost free from pain, and are able to take a considerable amount of exercise.

To patients suffering from this affection, all forms of exercise involving active or sudden movements of the body, such as running, dancing, jumping, or travelling over rough roads, must be strictly forbidden, and even long continued standing or much walking should be avoided. The following remarks by Dr. Roberts are of value :—

"If there be anæmia, or other disorder of the general health, the removal of this by appropriate remedies is of course to be attempted. Restoration of the tone of the abdominal muscles, which, in most cases, are relaxed and flaccid, is probably the most effective means of reducing to a minimum the inconveniences which attend on mobility of the kidneys. To this end, ferruginous and other tonics, and shower baths, with avoidance of fatiguing exercise, seem to be the means best adapted. A curious case is recorded by Dr. Hare, in which the mobility of the kidneys was markedly diminished after two pregnancies; the steady pressure of the gravid uterus having apparently acted as a mechanical support to the dislodged organs.

"The regulation of the bowels is a point to be carefully attended to. Accumulation of fæcal matter in the large intestines invariably aggravates the inconveniences of movable kidneys. Tight lacing and all violent modes of exercise (equitation, dancing) should of course be strictly forbidden.

"When the symptoms of so-called strangulation of the kidney occur—violent pains, sickness, frequent micturition, enlargement and excessive tenderness of the tumour—complete repose, in the recumbent posture, should be prescribed during the attack; hot poultices, or even leeches, should be applied over the seat of pain, and morphia administered internally."

Operative Treatment.—There are instances where the patient cannot bear any form of mechanical appliance to her abdomen, pressure seems, in fact, to increase rather than alleviate the symptoms, and even when the bandage is permissible, it cannot be expected to do more than temporarily fix the kidney. The organ is fixed so long as the pressure is applied, and is thereby prevented from coming in contact with, or dragging upon, other parts within the abdomen, and in this way the pain and uneasiness are, for the time being, relieved. To some the relief is but partial, and to all it is but temporary. The surgeon is, therefore, sometimes required to consider the question of operative interference. When severe symptoms are not ameliorated by other means, or if the patient has comparative comfort only when strict attention is paid to certain conditions, the irksomeness of which renders life miserable and useless, then the urgent demands of the patient make it necessary that something should be done to cure the disease or palliate suffering. Some authorities regard operative interference as unjustifiable, whether the operation consists of removing the organ by abdominal section, or by an extra-peritoneal incision in the lumbar region, or of the milder course of transfixing and stitching the kidney to the abdominal wall. When the patient is able to move about, or sit up in comparative comfort, with the assistance of an elastic bandage, then an operation should not be thought of. But it is otherwise when little or no relief is derived from milder modes of treatment. When severe pain is experienced, extending to the lower part of the abdomen, and felt also in the course of the crural nerves, in the loin, thighs, and genitals, increased by any exertion, or even by movements in bed, sometimes amounting to paroxysms resembling nephritic colic, and occasionally accompanied by fainting, sickness, and persistent vomiting, then I do not see why the only chance of relief should be denied to the unfortunate sufferer.

I. *Nephrectomy.*—Keppler claims that a movable kidney is a continual menace to the life of the patient, and that the danger should be removed by the excision of the organ as soon as detected. Landau, on the other hand, believes that it seldom threatens life, and regards nephrectomy as unjustifiable. Of late years, great advances have been made in regard to operations on the kidney, but still the mortality from nephrectomies is very high. It must not be forgotten, however, that in most of the cases operated upon, one or both organs were the seat of organic disease; and it is well to bear in mind that, when the excision is performed in such cases, the increased power of secreting urine is not demanded from a healthy kidney, where compensatory hypertrophy may be readily established, but from an organ probably unable to perform more than its own share of the work. Nephrectomy for organic disease is one thing, extirpation of the kidney, on account of its mobility, is another.

The following table, prepared by Dr. Harris of Philadelphia, shows the operations that have been performed up to the 15th of March, 1882.

Of the sixteen cases of movable kidney, recorded in the accompanying table, ten of the patients recovered and the remainder died, and of these latter one suffered from sarcomatous disease, another from encephaloid cancer, and a third from fatty degeneration of the kidney. So that, in only three can the kidneys be described as healthy. That is to say, out of thirteen cases where a healthy kidney was excised three died, thus giving a mortality of twenty-three per cent. In the other diseased conditions calling for the operation, the mortality was almost exactly fifty per cent, and in not a few of them both kidneys were found to be diseased. The high mortality in such cases can be easily understood. For many years it has been a

No.	Date.	Operator.	Locality.	Sex	Age	Seat of incision	Diseased condition of the subject operated upon.	Died.	Recovered.
1	June 4, 1861	E. B. Wolcott	Milwaukee, U.S.	M.	58	Abdomen	Encephaloid kidney. Diagnosed a cyst of the liver.	D.	
2	June 26, 1867	Spiegelberg	Breslau	F.	42	A.	Hydatid cyst of kidney. Diagnosed an ovarian cyst. *Removal incomplete.*	D.	
3	April, 1868	Peaslee	New York	F.	..	A.	Solid renal tumour. Diagnosed an ovarian growth.	D.	
4	April 2, 1869	Simon	Heidelberg	F.	46	Loin	Fistula of ureter produc'd in an ovaro-hysterectomy; kidney not diseased.	..	R.
5	Nov. 15, 1869	Esmarch	Kiel, Ger.	F.	19	A.	Large cyst of kidney, with pelvic adhesions; diagnosed ovarian.	D.	
6	?	Reported by S. Wells	London	F.	..	A.	Fibro-cystic tumour of uterus, with an adherent normal kidney.	D.	
7	Dec., 1870	Gilmore	Mobile, U.S.	F.	39	L.	Painful movable shrunken fibrous kidney; woman 5 months pregnant, and went to full term.	..	R.
8	Mar. 23, 1871	Von Brüns	Wurtemb'rg	M.	..	L.	Gunshot wound of kidney converting the organ into a large abscess.	D.	
9	June, 1871	Meadows	London	F.	..	A.	Large cyst of kidney. Diagnosed ovarian.	D.	
10	Aug. 8, 1871	Simon	Heidelberg	F.	30	L.	Small Fibrous kidney containing blood-clots. Diagnosis, calculous pyelitis.	D.	
11	May 14, 1872	Durham	London	F.	43	L.	Painful kidney: organ appeared healthy; nephrotomy had failed to give relief.	D.	
12	May 16, 1872	G. A. Peters	New York	M.	36	L.	Tuberculous kidney. Diagnosis, calculous pyelitis; other kidney found diseased on autopsy.	D.	
13	Jan. 7, 1873	Brandt	Klausenberg Austria	M.	25	L.	Extrusion of kidney through a knife wound in the loin.	..	R.
14	Dec. 2, 1873	Campbell	Dundee, Scotland	F.	49	A.	Cyst, involving lower third of kidney; presumed ovarian.	..	R.
15	Apr. 14, 1875	Le Dentu	Paris	M.	42	L.	Hydronephrosis and perinephritic abscess.	..	R.
16	1875	Marvaud	Algiers	F.	y'ng	L.	Extrusion of kidney through a wound with a yataghan.	..	R.
17	Dec. 7, 1875	Laugenbuch	Berlin	F.	32	L.	Sarcoma of kidney (?) Organ of a sack form; not examined microscopically.	..	R.
18	?	Langenbuch	Berlin	M.	20	A.	Painful floating kidney.	..	R.
19	Apr. 20, 1876	Kocher	Bern	F.	35	A.	Sarcomatous floating kidney. Colon and contiguous parts involved. *Removal incomplete.*	D.	
20	July 4, 1876	Hüter	Greifswald, Germany	F.	4	A.	Sarcoma of left kidney; weight nearly 5 pounds. Presumed a splenic or ovarian growth.	D.	
21	July 18, 1876	Billroth	Vienna	F.	46	A.	Hydronephrosis. Presumed an ovarian cyst.	D.	
22	?	Hamilton	China	M.	..	L.	Extrusion of kidney through a knife wound.	..	R.
23	Jan. 7, 1877	Jessop	Leeds, Eng.	M.	2½	L.	Encephaloid kidney; died of a return of the disease in nine months.	..	R.
24	Jan. 28, 1877	Heath	London	F.	24	A.	Calculous hydronephrosis; presumed to be ovarian.	D.	

No.	Date.	Operator.	Locality.	Sex	Age	Seat of incision	Diseased condition of the subject operated upon.	Died.	Recovered.
25	Aug. 6, 1877	Dumreicher	Vienna	M.	33	Loin	Sacculated and dilated kidney; diagnosed a calculous pyelitis.	D.	
26	Sep. 27, 1877	Kocher	Bern	M.	2½	Abd'm.	Adeno-sarcoma of kidney.	D.	
27	Feb. 18, 1878	Müller	Oldenburg, Germany	M.	21	L.	Calculous hydronephrosis.	..	R.
28	Mar. 14, 1878	Byford	Chicago, U.S.	F.	39	A.	Encephaloid kidney; 4½ pounds.	..	R.
29	Mar. 15, 1878	A. Martin	Berlin	F.	49	A.	Painful floating kidney; found healthy in appearance.	..	R.
30	Aug. 15, 1878	A. Martin	Berlin	F.	30	A.	Painful floating kidney; no appearance of disease.	..	R.
31	Nov. 14, 1878	A. Martin	Berlin	F.	25	A.	Painful floating kidney.	..	R.
32	Dec. 9, 1878	A. Martin	Berlin	F.	53	A.	Sarcoma of kidney, 28 oz.	..	R.
33	Jan. 9, 1879	Zweifel	Erlangen	F.	29	L.	Uretro-uterine fistula, after labour, with atrophy of the kidney.	..	R.
34	Jan. 19, 1879	Czerny	Heidelberg	M.	59	A.	Malignant tumour of kidney. Aorta ligated to arrest hæmorrhage.	D.	
35	April 1, 1879	Billroth	Vienna	F.	35	A.	Retro-peritoneal myo-fibroma with a sound kidney attached. Presumed to be an ovarian cyst.	D.	
36	April, 1879	Urbinati	Cesena, Italy	F.	56	L.	Calculous pyelitis.	D.	
37	Apr. 19, 1879	A. Martin	Berlin	F.	48	A.	Painful floating kidney.	D.	
38	May 22, 1879	Czerny	Heidelberg	F.	32	L.	Fistula and pyonephritic abscess.	..	R.
39	June 23, 1879	A. W. Smyth	New Orleans U.S.	F.	35	L.	Painful floating kidney.	..	R.
40	June 24, 1879	A. Martin	Berlin	F.	24	A.	Painful floating kidney.	D.	
41	July 17, 1879	E. Martini	Hamburg	F.	37	A.	Painful floating kidney.	..	R.
42	Aug. 11, 1879	Lossen	Heidelberg	F.	37	A.	Angio-sarcoma attached to a sound movable kidney; woman pregnant; aborted in 12 hours.	..	R.
43	Oct. 6, 1879	Czerny	Heidelberg	F.	37	A.	Hydronephrosis.	..	R.
44	Oct. 24, 1879	Merkel	Nürnberg	F.	28	A.	Painful floating kidney, affected with fatty degeneration.	D.	
45	Nov. 4, 1879	Bardenheuer	Cologne	F.	46	L.	Pyonephrosis and fistula.	..	R.
46	Nov. 23, 1879	Bardenheuer	Cologne	F.	22	L.	Pyonephrosis and abscess	D.	
47	Dec. 23, 1879	A. E. Barker	London	F.	21	A.	Encephaloid floating kidney.	D.	
48	Jan. 3, 1880	Thornton	London	F.	7	A.	Hydronephrosis of left kidney.	..	R.
49	Jan. 16, 1880	Savage	London	F.	56	A.	Hydronephrosis.	..	R.
50	Feb. 17, 1880	Lucas	London	M.	36	L	Pyonephrosis, with lumbar fistula.	..	R.
51	Mar. 9, 1880	Czerny	Heidelberg	M.	23	L.	Hydronephrosis, with sarcoma.	D.	
52	April 3, 1880	Czerny	Heidelberg	F.	27	L.	Uretro-vaginal fistula of right side; kidney not diseased.	.	R.
53	Apr. 24, 1880	Couper	London	F.	y'ng	L.	Saccular and dilated kidney containing fetid pus.	..	R.
54	May 3, 1880	Czerny	Heidelberg	F.	40	A.	Hydronephrosis of right kidney; lived 48 days.	D.	
55	May 15, 1880	Czerny	Heidelberg	F.	23	L.	Calculi in left kidney; pelvis dilated.	..	R.
56	May 19, 1880	Credé	Dresden	F.	26	L.	Uretro-uterine fistula.	..	R.
57	May 20, 1880	Le Forte	Paris	M.	23	L.	Lumbar renal fistula; kidney very slightly altered	D.	
58	May 24, 1880	F. Lange	New York	F.	47	L.	Cystic kidney containing concretions; other kidney found useless on autopsy.	D.	
59	May 29, 1880	Spiegelberg	Breslau	F.	27	A.	Enlarged kidney, not apparently altered in structure. Diagnosed a hydronephrosis.	..	R.
60	July, 1880	Raffa	Rovigo, Italy	F.	20	L.	Suppurative nephritis, with purulent infection and tuberculosis. Lived four months.	..	R.

No.	Date.	Operator.	Locality.	Sex	Age	Seat of incision	Diseased condition of the subject operated upon.	Died.	Recovered.
61	July 5, 1880	A. E. Barker	London	F.	32	Loin	Calculous pyonophrosis.	D.	
62	July 20, 1880	A. Martin	Berlin	F.	..	Abd'm.	Painful floating kidney.	D.	
63	Aug. 2, 1880	Czerny	Heidelberg	F.	11 mo.	A.	Large adenoma of left kidney.	D.	
64	Aug. 19, 1880	J. H. McClelland	Pittsburg, U.S.	F.	20	L.	Calculous pyo-hydronephrosis, with fistula in lumbar and inguinal regions.	..	R.
65	Oct. 3, 1880	Bardenheuer	Cologne	F.	48	L.	Cancer of uterus, involving the left ureter.	D.	
66	Oct. 5, 1880	A. E. Barker	London	F.	38	L.	Calculous pyonephrosis.	D.	
67	Nov. 28, 1880	A. Martin	Berlin	F.	..	A.	Painful floating kidney.	..	R.
68	1880	Langenbuch	Berlin	F.	30	A.	Painful floating kidney.	.	R.
69	?	Bardenheuer	Cologne	..	5	L.	Pyonephrosis.	..	R.
70	Jan. 10, 1881	Czerny	Heidelberg	F.	35	L.	Pyonephrosis of right kidney.	..	R.
71	Jan. 30, 1881	Clementi	Catania, Italy	F.	28	L.	Pyonephrosis of left kidney.	..	R.
72	Feb. 22, 1881	W. M. Baker	London	F.	7	L.	Tuberculosis of kidney. 2¾ oz.	..	R.
73	Feb. 22, 1881	Stockwell	Bath, Eng.	M.	54	L.	Sacculated and enlarged kidney. 10 oz.	D.	
74	Apr. 23, 1881	Czerny	Heidelberg	M.	51	L.	Angio-sarcoma of left kidney.	..	R.
75	?	Barwell	London	F.	16	L.	Pyonephrosis.	D.	
76	May 5, 1881	Barwell	London	M.	18	L.	Calculous pyelitis and retro-peritoneal abscess.	..	R.
77	May 7, 1881	Czerny.	Heidelberg	F.	45	A.	Sarcoma of lower part of left kidney.	D.	
78	? 1881	Bardenheuer	Cologne	..	..	L.	Hæmaturia and renal colic	..	(?)[1]
79	? 1881	Bardenheuer	Cologne	M.	20	L.	Renal calculus and pyonephritic abscess.	..	(?)[1]
80	? 1881	Bardenheuer	Cologne	M.	26	L.	Sarcoma of kidney.	..	(?)[1]
81	June 17, 1881	Czerny	Heidelberg	M.	52	L.	Calculous hydronephrosis	D.	
82	July 14, 1881	Godlee	London	F.	57	A.	Calculous pyelitis.	D.	
83	July 24, 1881	Rosenbach	Gottingen	M.	42	A.	Calculous pyelitis.	..	R.
84	July 25, 1881	Czerny	Heidelberg	M.	40	L.	Sarcoma of left kidney.	..	(?)[1]
85	Aug. 2, 1881	F. A. Kehrer	Heidelberg	F.	32	A.	Hydronephrosis.	..	R.
86	Aug. 3, 1881	Starek	Danzig	F.	42	L.	Wound of ureter in removing cancer of the uterus; nephrectomy 6 days later	..	R.
87	Sept. 5, 1881	Whitehead	Manchester	M.	46	A.	Solid tumour of left kidney. 1 lb. 4 oz.	D.	
88	Sep. 10, 1881	Hicguet	Leige, Belg.	F.	6	A.	Sarcoma of kidney.	..	R.
89	Oct. 15, 1881	T. G. Thomas	New York	F.	21	A.	Fibro-cyst involving kidney.	..	R.
90	Oct. 23, 1881	G. Lepold	Leipsig	F.	23	A.	Blood-cyst of lower part of left kidney.	..	R.
91	Nov. 1881	Frattina	Ponderone, I.	F.	28	L.	Pyonephrosis of left kidney.	D.	
92	Nov. 1881	O. O. Burgess	San Francisco	M.	53	A.	Large cystic tumour of kidney.	D.	
93	Dec. 1881	H. Marsh	London	M.	35	L.	Cystic kidney. *Removal incomplete.* Other kidney found sound, on autopsy.	D.	
94	?	Lücke	Germany	M.	60	..	Carcinoma of kidney; other kidney contracted and cystic.	D.	
95	?	Baum	Danzig	F.	..	..	Hydronephrosis of left kidney.	D.	
96	? 1882	Golding Bird	London	M.	yn'g	L.	Tuberculosis of kidney.	D.	
97	? 1882	Heywood Smith	London	..	..	A.	Hydronephrosis.	(?)	
98	Mar. 10, 1882	James Adams	London	M.	..	L.	Medullary sarcoma, with hæmaturia, presumed a calculous pyelitis.	(?)	
99	Mar. 11, 1882	Thornton	London	F.	..	A.	Pyonephrosis of right kidney.	..	R.
100	Mar. 15, 1882	Thornton	London	..	..	A.	Cystic, suppurating kidney. 4 lbs. 7 oz.	..	R.

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[1] These have generally been credited in the column of *recoveries*, although I cannot find any record to that effect.

recognised fact that animals can live, without their health being impaired, after one of their kidneys has been excised, so long as the remaining organ is healthy. It has also been satisfactorily shown that a man can afford to lose one half of his urine-secreting tissue. When one kidney is excised, as a rule, the urine is immediately diminished in amount by a half; but if the other kidney be healthy, its secreting power is greatly increased, so that, within a few days, a normal quantity of urine is excreted. When the operation is called for in cases of pyelitis, hydronephrosis, or local injury strictly limited to one side, it should be performed; but in cases of malignant disease, and tuberculosis of the kidney, where the probability is that both organs are involved, then the operation of excision is a very questionable procedure.

In cases of movable kidney, where the organs are the seat of organic disease, unless the diseased condition be strictly limited to the movable kidney, the operation seems unjustifiable, on the ground of the very high mortality; and where the case is one of uncomplicated movable kidney, then extirpation should not be thought of till nephroraphy has been tried and failed. It is not right to excise an organ so necessary to life as the kidney, before making an endeavour to save it by a less heroic operation. Excision should only be employed when all other measures have failed, and life is seriously threatened.

II. *Nephroraphy.*—When I saw my first case of movable kidney, in 1880, with Dr. Yair, I proposed not to excise the kidney—an operation I then knew had been done several times for the disease from which she was suffering—but to stitch it to the abdominal wall. At that time, however, I did not feel justified in urging her to have the operation performed, as I still entertained some hope of relief being derived from external appliances, and, besides, the operation of nephroraphy had then never been performed to my knowledge. Stitching the kidney, by means of sutures, to the abdominal wall, seemed in itself a less dangerous operation than excision, and the future prospects more favourable.

About a year after this, Dr. E. Hahn published, in the *Centralblatt für Chirurgie* for 23rd July, 1881, his first two cases—"In one case there was a strong suspicion that in one kidney, and possibly not the floating one, there was a calculus, while in the other, both kidneys were movable."

His first operation was performed, in April 1881, upon a woman, æt. 38, unipara, who suffered from severe pain, associated with movable displacement of the right kidney, and with a suspicion of a renal calculus on the right side. In the second case, the patient suffered from similar symptoms, and both kidneys were found to be movable, the right, however, more so than the left. The first case was quite successful, the second partially so.

The operation consisted of cutting down upon, but not opening, the capsule of the kidney, by an incision made along the edge of the sacro-lumbalis muscle, from the lowermost rib to the crest of the ilium. The adipose capsule was drawn into the wound and stitched to the muscle and fascia by six or eight catgut sutures.

In one of his cases the kidney became movable after the operation, so that Dr. Hahn now recommends more secure fixation by opening the capsule and stitching it to the more superficial tissues at a point corresponding to the lowest limit of the area of mobility, so as to avoid straining the adhesions when the patient stands upright.

The operation performed by Dr. Hahn seemed capable of removing all the disagreeable symptoms resulting from mobility of the kidney; by the posterior incision the peritoneum was not opened, and above all the patient was not deprived of any of her urine secreting tissue. The only fault the operation appeared to have was that it did not fix the kidney securely enough, as in one of the cases the organ became again slightly movable after the operation, and for this reason Dr. Hahn recommended that the capsule should be divided, and the edges secured to the surface of the wound.

In cases where the kidney is not movable within its adipose capsule, but simply floats about behind the peritoneum, an operation such as Hahn has performed may be sufficient, but when the adipose capsule has become separated, and forms a sac in which the kidney moves freely, something more requires to be done.

In my first case I found that on opening the adipose capsule the kidney was easily pushed backwards and forwards within it. I therefore found it not only necessary to stitch the edges of the open capsule to the wound in the abdominal walls, but also, in order to secure the kidney, to pass two sutures through the cortex, and fasten them externally by means of buttons. The details of the operation will be found in the appendix, Case I.

The objects in such an operation appear to me to be (1) to reduce the size of the cavity in which the kidney moves, (2) to fix the kidney and the walls of the sac to the abdominal parietes, and (3) to form adhesions between the kidney and the capsule surrounding it. When the adipose capsule is very loose, and the kidney moves freely within it, a portion of the capsule should be removed before stitching its edges to the wound in the parietes; by doing this the cavity is reduced in size, and the chances of future mobility are thereby lessened. The divided capsule should be stitched firmly either to the deep or to the superficial edges of the wound in the loin by not less than eight chromic catgut sutures, and two strong sutures of the same material should be passed through the abdominal walls, then through the cortex of the kidney, and out again through the muscles, fascia, and skin, on the other side of the incision. The sutures passed into the kidney become destroyed more rapidly than elsewhere; the living renal tissue seems to have an unusual power of absorption. The chromic catgut which I used was kindly given to me by Dr. William Macewen, and he informed me that it would probably last for a month or six weeks in the tissues. This I quite believe would be the case in any other tissue but the kidney; but the sutures in my case separated on the fourteenth day, and on examination I found that the portions which passed through skin, fascia, muscle, and even granulation tissue, were firm and strong, whereas the parts which had been in contact with the renal tissue were softened, and partly absorbed. It is therefore necessary to use a strong suture, and one that has been kept for a long time in chromic acid, for operations where the kidney is involved in the stitch.

With the object of forming a firm union between the parts it is well to allow any blood which may escape after the adipose capsule has been opened to remain in the latter, and so fill up any space that may be left between it and the kidney. I did this in my case, and have had no reason to regret it. When the case is kept aseptic, the blood clot readily becomes organised into connective tissue, and so forms a bond of union between the adipose capsule, the kidney, and the granulation tissue uniting the two edges of the wound. The deep edges of the wound should be kept wide apart by a large drainage tube, so as to allow a considerable mass of granulation tissue to form between these surfaces and the convex surface of the kidney.

Up to the present time the operation of nephroraphy has been very successful, no deaths having occurred as a consequence of it, and in some of the cases the suffering of the patient has been completely relieved; in others the symptoms have been modified considerably.

The following table includes the cases of the operation which I have been able to collect up to the present time:—

No.	Date.	Operator.	Locality.	Sex.	Age.	Kidneys Movable.	Result.
1.	10th April, 1881.	Hahn,	Berlin.	F.	28,	Both,	Complete cure after two operations.
2.	14th ,, ,,	Hahn,	,,	,,	38,	Right,	Cure.
3.	1882.	Hahn,	,,	?	?	?	Good.*
4.	,,	Küster,	,,	?	?	?	,, *
5.	,,	Esmarch,	,,	?	?	?	,, *
6.	September, 1882.	Bassini,	Pavia,	F.	27,	Right,	Cure.
7.	November, ,,	Weir,	New York	F.	33,	Right,	Cure.
8.	March, 1883,	Newman,	Glasgow,	F.	40,	Both,	Cure.

From the results shown in this table the operation cannot but be regarded as satisfactory, no deaths having occurred; and in all the cases the movements of the kidney have been prevented, and the symptoms from which the patients suffered previous to the operation have disappeared.

The advantages of nephroraphy over extirpation of the kidney are numerous, and may be briefly stated:—

1. In the operation of nephroraphy the organ is not removed, so the secreting tissue is not diminished in amount as it is in excision, and there is therefore no danger of removing, as has been done, the only kidney the patient may be possessed of.

2. The mortality in excision, even in cases where the remaining kidney was healthy, is not very encouraging (23 per cent), whereas, in eight cases operated upon by nephroraphy there have been no deaths.

3. Nephroraphy may be performed when both kidneys are movable, or when one of them is diseased. In one of Hahn's cases the kidney, which was not displaced, contained a calculus. This did not prevent the operation being successful.

4. In stitching the kidney to the abdominal wall the peritoneum is not opened, as it is in the anterior operation for excision, where the membrane is incised at least twice.

5. Extirpation is only permissible when nephroraphy has failed and the patient's life is still seriously threatened, or when the movable kidney is diseased and the fixed kidney healthy.

The importance of the latter point was illustrated in Case

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* These cases are mentioned in a report of the Deutschen Gesellschaft für Chirurgie, XI Kongress, published in a supplement to the *Centralblatt für Chirurgie*, 1882, No. 29. The operations are mentioned, but no details are given further than that they were successful as far as could be judged, considering the short time that had elapsed since they were performed.

III, where one of the kidneys (the right one) was known to be diseased; it diminished in size under observation, and albumen, and granular and hyaline tube casts were found in the urine. In this case the movable kidney was diseased, the patient's sufferings were great, and she was urgent that an operation should be performed for her relief. The question then arose, was the diseased condition limited to the movable kidney? if so, then an operation for its removal might be justified, but should the other kidney prove also to be involved, operative interference was out of the question.

The only accurate method of determining this appeared to be to catheterise both ureters and examine the urine from each kidney separately. This was done, and both organs were found to be diseased. The idea of operating was therefore abandoned.*

In all cases where excision of a kidney is contemplated, the most careful examination should be made regarding the condition of the kidney on the opposite side, and where it is at all practicable the ureters should be catheterised, as the most certain means of determining whether or not the remaining organ is healthy.

In women catheterisation is very easy, while in men compression of the ureters may be practical without great difficulty. Compression is not so reliable as passing a catheter, but in the male the practical difficulties of the latter operation are so great with means at present at our disposal, that it must be given up as infeasible.

FLOATING KIDNEY.

At the beginning of this paper, displacements of the kidney were divided into two forms. In the one the organ was described as being movable behind the peritoneum (movable kidney), in the other the kidney was attached to the spine by a meso-nephron, and lay within the cavity of the peritoneum, where it might move to the extent of its mesentery (floating kidney).

Objections may be raised to this division of the subject, seeing that, as a matter of custom, the two terms are used synonymously by most writers, and that, clinically, the two conditions are not distinguishable from one another. It is only after the abdomen is opened that the presence or absence of a meso-nephron can be demonstrated. It is necessary, however, from the surgical standpoint, particularly when operative interference is contemplated, to carefully separate the two conditions from one another. In movable kidney the organ can be exposed without opening the peritoneum, whereas, in floating kidney, it cannot. These varieties of displacement are recognized, not only by being distinct anatomically, but also in their etiology being different. Floating kidney is always a congenital condition, whereas movable kidney is usually acquired. Oppolzer and the earlier writers on the subject looked upon elongation of the renal vessels as a proof of the affection not being acquired; they, however, did not distinguish between the two forms, but grouped all displacements of the kidney associated with mobility in one class. The etiology of movable kidney has been already fully discussed. It will now be necessary to make only a single remark regarding the causation of floating kidney.

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* Details of the method adopted in catheterising the ureters will be found in the Appendix, Case III.

Cases where the kidney moves by reason of the existence of a meso-nephron are very rare, so uncommon, indeed, that such writers as Lawson Tait, and Jago are disposed to doubt the possibility of such an occurrence. That it may exist has been already shown; it is not necessary, therefore, again to discuss the question.

Floating kidney, as already stated, is always a congenital condition, and the existence of a meso-nephron is not uncommonly associated with other malpositions of the peritoneum, or of other abdominal organs. The following case, reported by Mr. Durham, illustrates this point:—

"Upon opening the abdomen of J. C., æt. 34, it was at once noticed that the left kidney was situated lower down and nearer the middle line than usual; the descending colon was also nearer the middle line, and formed no sigmoid flexure in the left iliac fossa, but passed across the last lumbar vertebra, and entered the pelvis on the right side of the sacrum.

"Upon slightly pressing the kidney, it slipped at once into its normal situation, and upon further examination it was found to be movable to a most remarkable extent. By changing the position of the body, or by gentle manipulation, the kidney was caused to pass, according to circumstances, quite up under cover of the ribs, across to the front and slightly to the *right* side of the bodies of the vertebræ, or down into the iliac fossa. This mobility appeared to depend principally upon the unusual disposition of the peritoneum, which was associated with the misplacement of the colon. Instead of passing over the anterior surface of the kidney, and then forming the descending mesocolon, the peritoneum from the side of the spinal column only just touched the lower part of the inner border of the kidney, and then, having been reflected over the descending colon, touched the lower part of the outer border of the kidney, as it passed on to line the side of the abdominal cavity; and again, the 'lesser sac of the peritoneum' extended behind the spleen, and as low down as the upper border of the kidney. Thus, the kidney, instead of being fixed in its position by a single layer of peritoneum over its anterior surface, was placed, as it were, in the middle of three diverging layers, none of which could afford much support.

"Before any of the viscera were injured or removed, the trunk of the subject was exhibited to the Society, and careful diagrams were made of the disposition of the viscera, and of the various positions which the kidney could be made to assume by mere motion of the body.

"Upon dissection, it was found that there was little or no fat in the lumbar region, and that the kidney was consequently only surrounded by very loose cellular tissue. To this circumstance, doubtless, must be attributed, in great part, the remarkably prominent appearance of the kidney when the abdomen was laid open. The renal artery was somewhat longer and thinner than usual. The kidney itself was rather small, but of perfectly healthy structure. No other anatomical peculiarities than those already described were met with. No history of the recognition of the mobility of the kidney during life could be obtained."

It would, indeed, be difficult to explain how a meso-nephron, properly so called, could be formed otherwise than congenitally, unless by supposing that the displaced kidney has pushed before it a fold of peritoneum, the surfaces of which have become adherent around it, and united to each other along the line of the renal vessels. That such a condition might arise as a result of localized peritonitis seems possible; there are, however, no cases recorded where there is any evidence of this having taken place. When inflammation has occurred in cases of movable kidney, it has in most instances led to an adhesion of the layers of the peritoneum, not only to the kidney and to one another, but also to the surrounding parts, the result being that the kidney ceased to be movable, and became fixed in an abnormal position.

The point of importance to be attended to in connection with floating kidney is that it cannot be reached by an operation from behind without opening the peritoneum, and is therefore not so favourable for nephroraphy as movable kidney. This should be borne in mind while operating. It is not possible, however, previous to the operation, to distinguish, by physical examination, the two conditions.

Some authorities have expressed the opinion that floating kidney is more freely movable than movable kidney, and use this as a basis for diagnosis. This is an error. In not a few cases of movable kidney, the kidney can be pushed with perfect freedom up under the ribs, down into the pelvis, and for a short distance across the middle line. What greater freedom of movement could be shown? It is true that in some instances of movable kidney the excursion may be limited to an up-and-down motion in a plane parallel to the lumbar muscles. This is seen when the sac in which the kidney moves is formed by the adipose capsule, without the capsule being detached from its seat behind the peritoneum. Where, however, the peritoneal covering has become raised from the posterior abdominal wall, then less impediment is offered to movement, and so what was clearly at first a case of movable kidney gradually may assume the physical signs of the more mobile form, and may pass, according to some observers, from the class of movable kidneys into that of floating ones.

Fortunately, floating kidney is a very rare condition, but nevertheless it must not be entirely overlooked [where an operation is contemplated for the cure of the more common variety of displacement with mobility.

APPENDIX.

Case I.—Mrs. M'M., æt. 40. The history of this case practically commences fifteen years ago, when she gave birth to her first child. From that time she has not enjoyed her previous good health. For some time she suffered from no well defined complaint, but experienced undue fatigue after slight exertion. Between the birth of her first and second children, a skin eruption (psoriasis) appeared, first on the ankles, but soon afterwards it spread to the legs, abdomen, chest, and hands. It disappeared, however, when she again became pregnant. Following the birth of her second child, she had two miscarriages, each at the third month, and a third at the fourth month, between the birth of the fourth and fifth children. After the birth of the third child, she made a very poor recovery and suffered from a vaginal discharge for fully four months. On rising from bed soon after this, the third delivery, she suffered from a pain in her right side, but did not observe any swelling. The pain was usually of a burning character, but, during menstruation and when she again became pregnant, the pain was more severe and occurred in paroxysms.

After a confinement in May, 1877 (sixth pregnancy), a swelling was detected on the right side by the patient, although the exact nature of the tumour was not made out by her medical attendant. For the last seven months of her last pregnancy (seventh), she was compelled to remain constantly in bed in consequence of the severe pain in the right side, which became much worse whenever she attempted to rise. The pain was usually accompanied by sickness, retching, and vomiting during the three months preceding delivery. After delivery the pain was less severe, and the sickness and vomiting were not so constant.

It was shortly before her last delivery that I first saw her, with Dr. Yair, of Kilcreggan, who suspected the presence of a "floating kidney;" but, owing to the pregnancy, it was very difficult to make out the exact condition of matters. A tumour, however, was detected on the right side, freely movable, which receded under the lower ribs on pressure and fell down again when the patient was placed on her right side.

After the child was born, I saw her on several occasions, when it became quite evident that the case was one of movable kidney. At this time (1880) I raised the question of cutting down on the kidney and stitching it to the abdominal walls; but, after careful consideration, Dr. Yair and I agreed that it would be better, in the meantime, to try what effect a continuation of milder treatment might have; and, as she could not be dealt with satisfactorily at home, we arranged to have her sent to the Western Infirmary, where she was placed under the care of Dr. Finlayson. The following short extracts from the Ward Journal will give an idea of her condition while she was in the hospital. "On palpating the abdomen, when she lies on her left side, a movable tumour may be felt in the right hypochondrium, kidney shaped, smooth on the surface, and with pressure may be moved about, up under the lower ribs, and down towards the pelvis, but never past the middle line." . . . "Patient has been mostly confined to bed, up sometimes for a day or two, but never many days in succession. Her inability to be up seems to depend upon the occurrence of pain in the right side, in the region of the kidney, and she finds that she cannot allow anything to press upon it." . . . "Patient has been suffering from increased severity of the pain on the right side. This condition she connects with the function of ovulation; as for the last few days she has been menstruating."

After she had been in the hospital for some time, she appears to have suffered considerably from menorrhagia and leucorrhœa, arising from granular ulceration of the os and cervix. The symptoms, however, soon disappeared under treatment.

From 1880 till 1883, she was in the wards of the Western Infirmary on three occasions. The first time for a month, during which period she improved considerably. The psoriasis almost entirely disappeared, and the symptoms referrible to the movable kidney considerably improved, so much so that, on her return home, she attempted to perform her household duties, but in a short time these proved too much for her, so that in a month she was in very much the same condition as formerly.

I again saw the patient at this time (July, 1881) and Dr. Yair informed me that since the birth of her last child she had been complaining of a pain in the left side. During her residence in the Western Infirmary this pain did not trouble her, and no swelling or tumour was detected on the left side; but on her return home, and after several weeks' attention to household work, this pain became considerably increased, and on examination the left kidney also was found to be displaced. The mobility of the left kidney is not so great as that of the right, but when it is displaced it gives rise to more severe symptoms. By September 1881, she was worse than ever. The sickness, retching, vomiting, and diarrhœa had returned. Paroxysms of pain in the neighbourhood of the displaced organs, and radiating in the direction of the loins, thighs, and round the lower part of the belly, were frequent and severe. As the patient at this time appeared to receive no permanent relief from any treatment, I again proposed operative interference, but she preferred to try another course of treatment in the Western Infirmary, as she had considerably benefited by her former residence there. The following is a short summary of the notes made in Dr. Finlayson's Journal during her second period of treatment in his wards.

Confined to bed on account of pain in region of kidneys, increased on pressure and aggravated during menstrual period. Hysteria, associated with fits accompanied by giddiness and sometimes loss of consciousness. Slight feverishness, accompanied by a trace of albumen in urine, which soon disappeared. Suffering from menorrhagia and leucorrhœa, ulceration of os and cervix; symptoms relieved by administration of liq. ergotæ and application of carbolic acid to cervix. Severe and persistent vomiting, preceded and followed by burning pain in epigastric region, on left side and behind left shoulder, constant pain in right lumbar and iliac regions increased on pressure, and relieved by flexion of limbs on abdomen. Temporary relief from poultices, fomentations. Morphia, chloral, and bromide of potassium had little or no effect in producing sleep, and increased vomiting. Most relief from poultices and belladonna. Unable to wear an elastic bandage; pressure increases pain and other symptoms.

Patient was so ill during the latter portion of her stay in the Infirmary that Dr. Finlayson had almost despaired of her life, and asked her to consider whether or not she would submit to have her kidney stitched. This proposal, however, seemed to frighten her, as she left the Infirmary soon after.

I again visited her at Kilcreggan in the beginning of March 1883, and noticed a considerable change for the worse since I had last seen her. It seemed now quite evident that nothing more could be done in the way of treatment short of operative interference. She had not been out of bed for fully two years, unless while she was being conveyed to or from the Infirmary. Her life was rendered miserable by constant vomiting, sickness, and the pain which she suffered when the kidney became displaced, and she was rapidly emaciating from want of nourishment. I therefore felt justified in urging her to submit to an operation, and having consented to this, she was brought up to the Training Home for Nurses a few days after.

The physical signs were not much altered from what was observed previously. The condition was as follows:—The abdominal walls were thin and flaccid, so that the kidneys, particularly the right, when displaced, could be grasped with the hand and their form easily made out. The right kidney was most movable, so that when patient sat up or lay upon her left side the organ fell forwards, or if the hand was thrust into the loin the kidney was easily pushed forward and grasped, but generally resumed its normal position when the pressure was withdrawn. It was easily moved up under the ribs, downwards into the pelvis, and about two inches to the left of the middle line in front. The left kidney was not so easily displaced as the right, and its mobility was not so great. It moved readily upwards and downwards, but not farther forwards than a line drawn between the centre of Poupart's ligament and the left nipple. When the organs were displaced there was slight flattening in the renal regions. The percussion over the tumours was dull tympanitic.

On the 29th of March the operation of nephroraphy was performed.

About ten minutes before the anæsthetic was administered, a sixth of a grain of morphia was injected hypodermically. Anæsthesia was produced by chloroform, and all antiseptic precautions were attended to. The patient having been placed on her left side, an incision was made in the right loin, immediately external to the outer edge of the quadratus lumborum, and extending from the lowermost rib to the crest of the ilium, care being taken to avoid the diaphragm and pleura above, and the peritoneum in front. The tissues were divided down to the mass of fat surrounding the kidney, which was found to be freely movable behind the peritoneum. The kidney was not in position while I was cutting down upon the capsule, but was situated behind the anterior edge of the liver. As soon as the abdominal walls were divided Dr. Donald Macphail, who assisted me, thrust his hand into the wound, and by a little manipulation succeeded in pushing the kidney into the incision, and retaining it in position. Two sutures were then passed through the adipose capsule, so as to retain it in position. The adipose capsule was then divided for a distance of about three and a half inches, and the convex border of the kidney was exposed. The kidney was easily pushed backwards and forwards within the adipose capsule, but the thin fibrous capsule was not loosened. The organ appeared to be perfectly normal. Two thick chromic catgut sutures were passed deeply into the cortex of the kidney so as to include its whole thickness. The needle entered the anterior surface, and passed out from the posterior aspect about half-an-inch from its convex margin. One suture was passed through the upper and the other through the lower part of the organ, and the kidney was allowed to slip back into the sac formed by the adipose capsule. The edges of this capsule were now carefully stitched to the deep edges of the wound in the parietes, and the sutures (8) cut short. Three superficial sutures were then introduced, and the sutures through the kidney were also passed through the muscles, fascia, and skin; the kidney was then drawn into position and a large drainage-tube placed between the convex margin of the kidney, which now filled the bottom of the wound, and the superficial stitches. These stitches were then tied and the sutures through the kidney were secured externally by means of buttons.

The hæmorrhage during the operation was insignificant in amount. On piercing the kidney some blood escaped from the needle wounds, and flowed into the adipose capsule. This was allowed to remain in the hope that it would become organised, and so render the union of the parts more complete. The coaptation of the external lips of the wound was made as perfect as possible, while the deeper parts were kept separate by a large drainage-tube, in order that a considerable granulating surface might form in contact with the body of the kidney.

The wound was dressed with iodoform and antiseptic gauze, and an elastic bandage applied round the abdomen.

Immediately after the patient recovered from the effects of the anæsthetic, a sixth of a grain of morphia was administered hypodermically. She bore the operation well.

The treatment consisted of the administration of small quantities of brandy and beef tea, a teaspoonful of each alternately every half-hour.

It is not necessary to enter into detail as to the minutiæ of the further course of the case, which was highly satisfactory. It will be of more interest to indicate in a general way the subsequent events.

The external wound was completely united on the tenth, and the deep stitches came away on the fourteenth day. There was no suppuration at any time either from the surface or from the deeper parts. The drainage-tube was gradually shortened after the eighth day, and the antiseptic dressings were discontinued on the fifteenth.

Only on one occasion (on the second day) did the temperature reach 100° F., and only on three occasions was it over 99° F. The pulse was never more than 90, indeed very seldom over 80 per minute.

The condition of the urine was remarkable in so far that it remained almost perfectly normal during the whole course of the case. The following table will show the quantities for the first ten days after the operation.

	Quantity.	Sp. Gr.	Urea.	REMARKS.
Mar. 29,	23 oz.	1025	2·1 p. c.	Strictly normal.
„ 30,	17 oz.	1027	2·2 „	Suspicion of a trace of albumen. No blood
„ 31,	24 oz.	1024	2·0 „	No albumen or blood. Deposit of urates.
April 1,	15½ oz.	1026	2·2 „	„ „ „ „
„ 2,	23 oz.	1024	2·1 „	„ „ „ „
„ 3,	20 oz.	1024	2·0 „	„ „ „ „
„ 4,	25 oz.	1023	2·0 „	Normal.
„ 5,	27½ oz.	1023	1·9 „	„
„ 6,	?	1022	1·8 „	„
„ 7,	24 oz.	1026	2·0 „	„

During the time these observations were made the patient was taking very little food, the quantity being reduced as much as possible for fear of causing vomiting. This accounts for the smallness in the quantity of urine.

On the 30th, the day after the operation, Dr. Middleton, who attended the case for some time along with me, was suspicious of a slight trace of albumen, but really the indication of it was so slight that we could not be certain of it.

By carefully regulating the diet vomiting was completely prevented. The first time she did vomit was on the 14th of April, after taking an egg for breakfast, which she blamed for causing it. The symptoms referrible to the movement of the right kidney have never troubled her since the operation, but she still complains of the left kidney occasionally, when she is without a bandage round the abdomen.

I made the following note on the 1st of June:—

Since the operation, patient has not complained of pain in the right kidney. On palpating the abdomen, a mass somewhat larger than the kidney can be felt, firmly united to the abdominal walls, a little in front of the external cicatrix. When pressed firmly upon, the patient says that she does not suffer any pain, but experiences a sickening sensation. The left kidney is still movable, and causes occasional trouble when it becomes displaced; this, however, seldom occurs, as it can be kept in good position by a broad bandage.

For the last few days she has been suffering from leucorrhœa and pain in the region of the uterus, and yesterday she began menstruating. Since menstruation commenced she has complained of slight pain in the left kidney, but of none in the right.

Since the operation her general health has greatly improved, and she is now able to be up for six hours, and for the last ten days she has walked about the ward in comparative comfort. She has been wearing a broad elastic bandage, extending from the line of Poupart's ligament to the level of the seventh rib; while she has it on she can move about with freedom, but when it is off the left kidney is apt to become displaced.

[Since the operation was performed, now three months ago, she has been free from the symptoms arising from mobility of the right kidney, and is now able to walk about with comfort. She had not been out of bed, except to be taken to the Infirmary, for two years previous to the operation.—23rd June, 1883.]

CASE II.—W. O., æt. 49. For the last three years patient, who was at one time very stout, has been emaciating. He has suffered a good deal from chronic bronchial catarrh, attended with considerable muco-purulent expectoration which, on microscopic examination, is found occasionally to contain a few blood corpuscles, and a considerable quantity of pus. The physical signs are indicative of chronic bronchitis, accompanied by slight emphysema, without bronchiectasis.

The history of the case, as far as the movement of the kidney is concerned, dates from the beginning of last year (1882). He was out riding one day, when his horse stumbled, and he fell on his left side and fractured two of his ribs (the 9th and 10th left). He was kept in bed for about a fortnight after the accident. During this time he complained of a pain on the right side, immediately below the edge of the liver. The practitioner attending him at that time suspected an abscess, and treated him accordingly. While he remained in bed he did not notice any swelling or tumour on the right side, but after he got up he discovered a movable tumour seated in the hypochondriac region.

I saw this patient for the first time about nine months ago. He then complained of an occasional sickening pain in the right renal region, attended with vomiting, and sometimes followed by diarrhœa. The pain usually came on suddenly, and lasted for five or six hours. He noticed that if he took much exercise, or if the bowels were constipated, he was more apt to have an attack; when he took to bed the symptoms soon disappeared, but, on the other hand, if he continued to take even moderate exercise, the pain caused him considerable inconvenience.

On examination I found him greatly emaciated—the belly was loose and pendulous; palpation of the abdomen revealed the presence of an oval tumour immediately under the lower edge of the liver, and about two inches from the umbilicus. The tumour could be freely moved about in the abdomen, and pushed down into the pelvis, upwards under the edge of the liver, and an inch to the left of the middle line. Percussion over the right renal region, or over the tumour, did not yield any satisfactory results; but when the right loin was examined, the kidney having been previously displaced, a distinct flattening could be made out. When the tumour was handled a sickening sensation was experienced, resembling, as the patient informed me, the pain produced when the testicle is squeezed. A careful examination was made with the object of detecting the pulsation of the renal artery, as this case appeared to be a very favourable one for this purpose on account of the thinness and looseness of the abdominal wall, but no trace of movements resembling pulsation could be made out.

The only other symptom worthy of notice is the occasional sudden suppression of urine, without any very evident cause, and without any apparent relation to the position of the right kidney. Sometimes it commences without the organ being displaced, at least so far as can be detected by the hand, and there is no increase in the size of the organ during the time this symptom is present. The only explanation I can give for the scanty secretion of urine is to suppose that the kidney is rotated on its short axis, so that the ureter and blood-vessels are coiled round one another, and the passage of blood to and from the kidney is thereby prevented. The urine passed when the secretion has again become active does not differ from what is voided at other times. The following table will show the quantities and specific gravity of seven samples collected during one of the attacks. There was no urine passed between 11 A.M. on the 28th and 1 A.M. on the 29th of November:—

	Quantity.	Sp. Gr.	Urea.	REMARKS.
1882.				
Nov. 28, 7 A.M.,	10 oz.	1015	1·75 p. c.	Slight deposit of urates.
" 11 A.M.,	8 oz.	1017	1·85 "	" "
Nov. 29, 1 A.M.,	3 oz.	1016	1·7 "	Considerable deposit of urates
" 3 A.M.,	10 oz.	1019	1·9 "	" " "
" 8 A.M.,	6 oz.	1014	1·5 "	No deposit.
" 1 P.M.,	7½ oz.	1014	1·55 "	"
" 5 P.M.,	10 oz.	1018	1·7 "	"

It is interesting to contrast the symptoms and physical signs in this case with those of Case III.

Patient was directed to see that the tumour was in its normal position while in bed, and before rising to put on a close-fitting thin jersey and a broad elastic bandage round the waist, as was ordered for Case No. III, and an air ring-pad was fastened to the jersey immediately over the kidney. The effect of this treatment, together with careful attention to the general health, has been remarkable. The sickness, vomiting, and attacks of diarrhœa have now ceased, and the pain scarcely ever troubles him; but when it does it is usually rather severe; symptoms of suppression of urine still occur, but are not so frequent as formerly. If the bandage is left off for any time the symptoms are certain to return. I saw this patient about a month ago; he has had comparative relief from the pain, and the other symptoms almost never trouble him.

CASE III.—Mrs. M'D., æt. 43, enjoyed good health till after the birth of her last child (9th). Her last delivery was followed by symptoms which, at the time, were not very well understood, owing to their vague character. Within fourteen years she had nine children, all still alive, and two miscarriages, the first at the fifth month, between the birth of the third and fourth children, and the second, at the fourth month, between the birth of the eighth and ninth children. After the last delivery, she experienced sensations of vague uneasiness, not amounting to actual pain, but sufficient to prevent her from engaging actively in her household work. She became thin and anæmic, and menstruation, although regular, was profuse, and accompanied by an unusual amount of discomfort. About six months after the birth of her last child she complained of a pain, and at the same time became conscious of the presence of a movable tumour on her right side. Handling the tumour did not increase the pain very much, but caused her to become sick, and sometimes even to vomit. A few months later the pain became more severe, and dyspeptic symptoms manifested themselves. These symptoms were most marked during the menstrual periods, after taking exercise, and when the bowels were constipated.

When I saw her for the first time, in December 1881, nine months after her last delivery, the symptoms had become aggravated, so that she required to remain in bed while she was menstruating. On examination of the tumour on the right side, its nature became apparent. It was easily made out to be a movable kidney, as it presented all the characteristic physical signs which I need not here mention in detail. I examined the urine carefully, and found it to be strictly normal.

The following note was made on the 14th December, 1882: The symptoms are now very marked. Patient complains of almost continual pain, usually localized in the right lumbar region, but sometimes extending over the abdomen. It is greatly aggravated during menstruation, but becomes very severe at other times quite independently of ovulation. At these periods other symptoms are present, which seem to indicate obstruction to the excretion of urine. They generally appear very suddenly, and usually follow some sudden exertion at a time when the kidney is misplaced. They may last only for a few hours and disappear almost as suddenly as they arose, or they may endure for a period of twenty-four or even fifty-six hours. The first indication of one of these attacks is a sudden diminution in the quantity of urine excreted, sometimes amounting to an almost total suppression of it. The suppression of urine is followed by a rapid increase in the size of the movable tumour in the abdomen, which on these occasions occupies a position a little to the right of the middle line, with its lower border about an inch above the inner third of Poupart's ligament. The symptoms here referred to are different from those that are present during the menstrual periods; they consist of severe pain in the renal region, coming on in paroxysms and lasting for some time, accompanied by sickness, nausea, and vomiting. Their severity varies considerably in different attacks; sometimes they are relieved by rest in bed for a day, at other times they last longer, and are followed by symptoms of uræmia, such as dimness of sight, severe and persistent headache, and lethargy, with or without occasional paroxysms of excitement.

During the time these symptoms are present the quantity of urine is greatly diminished. The first indication of recovery is a sudden flow of concentrated urine, and a diminution in the size of the renal tumour, followed by the secretion of a large quantity of urine of a low specific gravity.

The following is a short note of the examination of the urine before, during, and after one of these attacks:—

1882.		Quantity	*Composition in 1,000 parts.*					
			Urea.	Uric Acid.	Phosph. Acid.	Chlorides.	Other Solids.	Total.
Dec. 9, -	10 A.M.	10 oz.	19·3	·41	1·95	10·1	5·2	36·96
„ 9, -	7 P.M.	8 oz.	36·3	·54	2·61	12·	6·3	57·75
„ 9, -	7·40 P.M.	18½ oz.	11·1	·19	·73	4·	2·1	18·12
„ 9, -	10 P.M.	16 oz.	12·3	·2	·61	5·3	3·	21·41
„ 10, -	1 A.M.	9 oz.	16·1	·5	1·3	11·	3·	31·9
„ 10, -	7 A.M.	7 oz.	23·4	·5	2·5	10·2	3·4	40·0

It will be observed that the specimen collected at 10 A.M. was practically normal. About noon the attack commenced, and continued till about 7·30 P.M. At seven o'clock, eight ounces of concentrated urine were passed, containing very nearly six per cent of solids, and at twenty minutes to eight, eighteen and a half ounces of dilute urine, containing less than two per cent of solids, were collected. In none of the samples examined could any abnormal constituent be detected, and, on microscopic examination, nothing was observed worthy of note. The explanation of the condition of the urine is rather difficult. If we suppose that the suppression of urine is due to torsion of the renal vessels or of the ureters, then it would be expected that this condition would be limited in its effects to the movable kidney, and that the opposite kidney would perform double duty, and so prevent symptoms of defective elimination of urine. The increase in the size of the movable tumour at the time the symptoms are present, and its disappearance before they are relieved, indicate very clearly that the attacks are due to obstruction to the flow of urine through the ureters, rather than to a suppression of the secretion as a result of strangulation of the renal vessels. The flow of a quantity of concentrated urine just before the symptoms disappear, and the simultaneous reduction in the size of the tumour, are easily associated as results of a common cause—the relief of the obstruction. The concentration of the urine seems to be due to absorption of a portion of the water contained in it during its lodgement in the distended ureter and pelvis.

It seems very extraordinary that what appear to be symptoms of uræmia, should occur so suddenly and be removed immediately after the obstruction to the ureter has been relieved. That a patient can live for eleven days without any kidney tissue, the only kidney she had having been removed, has been demonstrated by a case of Dr. Polk's, of New York, and the fact that, during a considerable portion of that time, no symptoms of uræmic poisoning manifested themselves, renders it all the more remarkable that, in my case, immediately after the suppression of urine, symptoms closely resembling uræmia should appear.

The attacks which accompany menstruation differ from those occurring along with suppression of urine. The pain is not so sharp, does not occur in paroxysms, is of a dull dragging character, and is not accompanied by other than slight dyspeptic symptoms, or symptoms referrible to the condition of the uterus.

17th February, 1883.—Since last report patient has had two attacks associated with suppression of urine. The first was a mild one, the latter, which happened on the 15th inst., was very severe and continued for three days.

A physical examination of the abdomen, made to-day, shows the kidney to be rather smaller in size than it was when I first examined it (January, 1882), and the movements are somewhat increased; when grasped with the hand, the sensations experienced by the patient are more disagreeable than they were formerly. The most important fact to be noted is the appearance of small quantities of albumen in the urine, which is now more copious than it was a month ago; its sp. gr. is low (1008-1012), and it occasionally contains a few hyaline and granular tube casts.

The anæmia is more marked than it was formerly, the features are pinched, the derangements of the digestive organs, loss of appetite, nausea, and irregularities of the bowels are more complained of than they were a few months ago.

Instead of giving the detailed account of the case as I have it recorded, I will give a general summary of the facts as noted from the beginning of this year till the present time.

Urine.—Since the beginning of the year the urine has been copious, of a low specific gravity, and containing a variable quantity of albumen. There was considerable difficulty in ascertaining regularly the exact quantities passed in the twenty-four hours, but as far as can be learned, they were considerably above the normal. On several occasions the whole of the urine was kept and carefully measured, when it was found to amount to from 70 to 90 oz. On no occasion, except after the attacks described above, has the specific gravity exceeded 1014. The average for the last five months is 1011, and the minimum 1007. The albumen varies in quantity from time to time, and is even sometimes temporarily absent. It has never been found to exceed ·210 per cent, and as a rule does not amount to more than ·08 per cent. The deposit in the urine is slight, composed of finely granular epithelium, mucus, leucocytes, and occasionally contains hyaline or granular tube cast.

The Movable Kidney.—The kidney has shown a general tendency to diminish in size, so that at the present time (June, 1883) it appears to be about a third less than it was in January, 1882. It continues freely movable, and when displaced, does not recede so easily into its normal position as it did at one time. During the first five months of this year patient had four attacks of severe pain, accompanied by suppression of urine, besides the inconvenience she has experienced during the periods of menstruation, and the sense of general discomfort from which she suffers at all times. About a month ago she was very anxious that I should operate upon her, as she was convinced, if the kidney was fixed, that she would enjoy her usual good health. The treatment both during the attacks and in the intervals procured her a certain amount of relief, but with this she was not contented, but desired something to be done that would cure her of her complaint.

The presence of albumen and tube casts in the urine was a very serious complication. The fact, however, that the right kidney was contracting gave rise to some hope that it alone was diseased, and that the left kidney was still healthy and in a condition to take up double duty if required.

Before entertaining the question of an operation, it was necessary to establish beyond doubt that the left kidney was healthy, and with this object in view, I considered the various ways by which it might be done. There was not much difficulty in being tolerably sure that there was a left kidney, as evidence of its presence in its normal situation was pretty clear. The point to settle was whether or not it was normal. The only method of determining this seemed to be to procure by some means separate samples of urine from each ureter.

This might be done in two ways—either by catheterisation of the ureters, or by compression of one of the ureters, while the other was allowed to remain patent. The method recommended by Glück, to ligature the ureter of the diseased kidney, to inject a solution of iodide of potassium, and examine the urine passed from the kidney supposed to be healthy, although a certain method, is a very dangerous one.

There are two methods by which the ureter may be compressed—(1) to press on it by the hand or a rounded lever in the rectum, as it crosses the common iliac artery on the left side, or the external iliac on the right side; (2) as suggested by Polk, by enclosing the ureter between the finger in the rectum, and a catheter in the bladder. The latter method seems to me to be the one most easy of application, and most likely to yield accurate results.

Dr. Polk describes it as follows:—"The method I have to suggest is, to compress the ureter. I confess it is easier of performance in the female than in the male, but I believe it can be accomplished in both. Take a large catheter, made of some substance like block tin, bend it to the shape of a Sim's sigmoid catheter; let the curve that passes into the bladder be as decided as it can be made, and yet not so great as to interfere with the ready passage of the instrument into the bladder. Suppose it to be the right ureter you desire to close. Introduce the instrument; then place the patient in the lithotomy position. Now carry two fingers as far into the rectum as possible.* Now place the catheter so that its curve in the bladder hugs the right pelvic wall; the end of the curve will pass directly across the line of the right ureter. Now press the fingers against the catheter, and the ureter will be sufficiently occluded to prevent all escape of urine. By means of the catheter in position (it may be double) you thoroughly cleanse and empty the bladder. As fresh urine flows in from the other ureter, it can be withdrawn and tested. As urine from a sound kidney is secreted at about the rate of a minim in four or five seconds, it will not require long continued pressure to secure the amount of urine necessary for satisfactory examination. In the female the procedure is more certain of accomplishment than in the male, because we can, in a measure, fix the base of the bladder by traction upon the anterior vaginal wall by means of a tenaculum hooked into it just below the cervix, or, better, well to the right of the cervix, on the lateral wall, the traction being downward and to the patient's left."

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* An instrument curved and grooved to receive the catheter might be substituted for the fingers for counter-pressure.

The advantages of catheterisation of the ureters over the compression of them, as a means of procuring two separate samples of urine—one from each kidney—seem apparent. If the ureters were constant in their position under all conditions, compression would be easy of application and certain in its results. But they are not so. The state of the bladder and bowel, as regards expansion, the situation of the uterus in the female, individual peculiarities, and other circumstances, alter the relations of the ureters, so that the operator might imagine that he was occluding one of them, while all the time the urine from both kidneys was flowing into the bladder.

When the bladder is well illuminated, the orifices of the ureters are easily seen, as narrow oblique slit-like openings, about two inches apart from one another. These openings are situated at the posterior angles of the trigon, nearly an inch and a half from the inner orifice of the urethra, and are united by a curved elevation, which, however, extends a little beyond them. The elevation referred to corresponds in position to the anterior lip of the os uteri externum.

The method which I adopted was to introduce into the bladder a small electric lamp connected with a battery composed of two Grove's cells. The electric lamp (Fig. 1, A) is connected with the handle (B) by a thin rod (E), in which the wires from the battery run. The lamp, when connected with two Grove's cells, gives light equal to one candle.

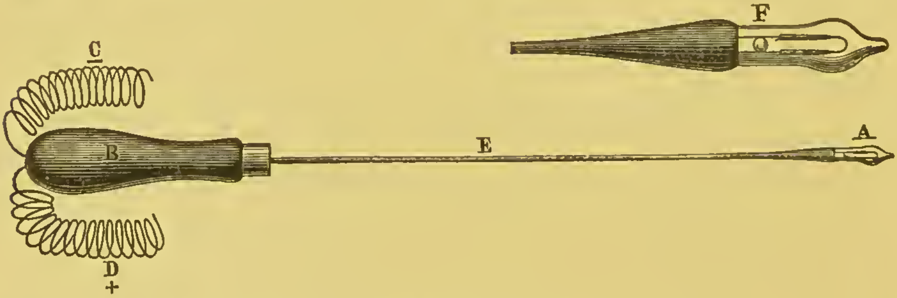

Fig. 1.

F. Electric lamp, full size. A, B. Lamp and handle, $\frac{1}{3}$.

The rest of the apparatus consists of a speculum and the catheters. The speculum is represented in Figs. 2 and 3. It is a hollow cone, made of vulcanite, the apex (H and J) of which is movable, and the small end of the remaining portion (G) is closed with a small glass disc. The apex is rotated out of its place by a handle (L).

The method of using these instruments is as folllows:—The bladder is first washed out with a warm solution of boracic acid, so as to remove all the urine. It is now distended with eight ounces of the boracic acid solution, and the electric lamp is introduced through the urethra without being connected with the battery. It is important that the lamp should be introduced before the circuit is completed, as if this precaution be not taken, the lamp is apt to become heated, and may crack when it is passed into the fluid contents of the bladder. Two gum-elastic catheters (No. 2) should now be passed, and after them the speculum is introduced with the cover (H) in position, as represented in Fig. 2. The current is now passed through the lamp, the cover (J) of the speculum is rotated, as represented in Fig. 3, and on inspection the structures forming the floor of the bladder are easily seen. The speculum should be passed so far into the bladder that the small end, closed by the glass disc, is about a quarter of an inch beyond the inner orifice of the urethra. The ureters are easily seen, and may be catheterised. The bladder is then allowed to empty itself, the catheters being retained in position, and the urine drawn off from each kidney separately. This method is of course only applicable to female patients, but may be used for any purpose where it is found necessary to examine the interior of the bladder.*

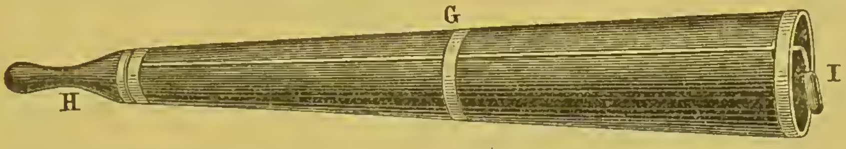

Fig. 2.

Speculum, G. Cover (to protect glass disc and facilitate introduction) in position, ready for introduction into bladder. Size, ⅔.

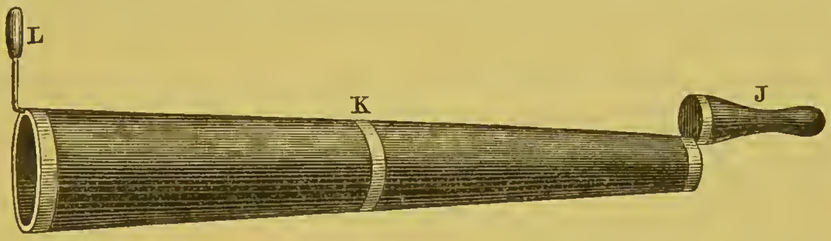

Fig. 3.

Cover (J) rotated by handle (L). In position after it has been introduced into bladder. Size, ⅔.

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* This instrument, although it performs its purpose well, is not perfect. I have been experimenting upon the dead body, and find that it will be of advantage to make certain modifications upon its present form. I may state that the catheters used have an eye at the point instead of at the side.

But to return to the case. As already indicated, a hope was entertained that the movable kidney alone was diseased, and that the left was still healthy and in a condition to do double duty should excision of the right organ be found advisable. The following note on the condition of the urine shows that an operation such as excision of the right kidney was out of the question, and that even nephroraphy would be attended with great danger to the life of the patient.

Urine from right kidney three hours after it was drawn off:—Pale straw colour, slight deposit, neutral reaction, sp. gr. 1012, urea, 1·10 $^{\circ}/_{\circ}$, albumen, ·35 $^{\circ}/_{\circ}$; no blood, bile pigments, or sugar. Microscopic examination showed the deposit to be composed of mucus, a few leucocytes, granular and fatty epithelium, but no tube casts could be detected.

Urine from left kidney:—Pale straw colour, slight deposit, neutral reaction, sp. gr. 1010, urea, ·95 $^{\circ}/_{\circ}$, albumen, ·38 $^{\circ}/_{\circ}$; no blood, bile pigments, or sugar. Microscopic examination revealed, in addition to the deposits found in the other sample, the presence of fatty, finely granular, and one or two epithelial tube casts.

Case IV.—J M‘D, æt. 28. When I saw this patient for the first time she informed me that about eighteen months before, while running upstairs, she fell upon her right side, the edge of the step coming in contact with the right loin. Soon after the accident she noticed a small movable lump on her right side, and suffered pain in the renal region, slight at first, but afterwards becoming more severe, so that she had to take to bed for a few days. Since that time the pain has been always present, but till about a week before I saw her it was never so severe as to compel her to give up her employment as a tablemaid. Six months ago, however, she had a severe attack of vomiting, accompanied by more or less pain in the region of the right kidney. These symptoms continued more or less till about two months ago, and were sometimes associated with a sickening sensation, frontal headache, palpitation, and diarrhœa. Menstruation was regular. There does not appear to be any relationship between the symptoms described above and the catamenia. Patient's general health appeared to be good. Her attention was, as far as I could learn, first directed to the tumour by the pain.

On physical examination I found a movable kidney on the right side. The sensation communicated to the hand conveyed the idea of the presence of a firm, resistant, smooth, rounded mass within the abdomen. Handling the tumour did not increase the pain, nor did it give rise to a sickening sensation. The position of the kidney was greatly influenced by the position of the patient: when she lay on her left side it fell a little to the left of the middle line; when she sat up it dropped into the pelvis; and when she lay upon her back it resumed its normal position in the lumbar region.

The only point which raised a doubt in my mind as to the nature of the tumour, was the statement by the patient, that she thought it had increased, and was still increasing in size.

The urine was strictly normal.

The patient being a servant in a large family, it was found inconvenient to treat her at home, so I recommended her to go to the Western Infirmary, where she remained, in Professor Gairdner's wards, from the 18th of January till the 24th of February 1882, when she was dismissed improved. The treatment adopted by Dr. Gairdner was to apply a ring-pad to the tumour, and a close fitting pair of stays were made by Mr. Hilliard to keep it in position. The patient at first derived considerable comfort from this, and was able to walk about without pain. She called upon me, however, a few months later, as ill as ever; the old symptoms had returned, and the stays afforded her little or no relief. On examining them, however, I found that they had become quite slack. I therefore ordered her to have an elastic bandage made, and to wear it in place of the stays, and when it became loose, to get a new one.

She is now using a broad abdominal elastic bandage, made of strips of roller bandage sewn together, and united in the middle line in front by means of a steel slip. Since she began to wear it she has not suffered from any of her former symptoms.

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